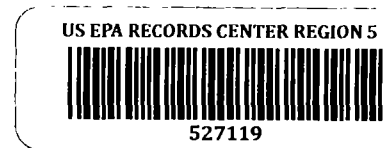
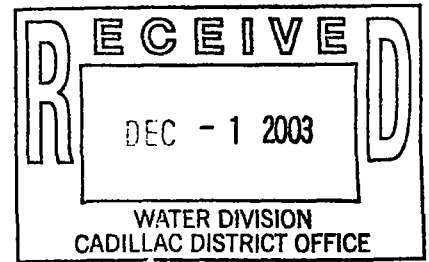


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HYDROGEOLOGIC STUDY REPORT

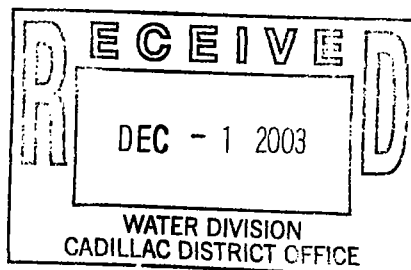
Williamsburg Receiving and Storage L.L.C.

Whitewater Township

Grand Traverse County, Michigan

Project # 02633061-29E

Book 1 of 2



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Williamsburg Receiving and Storage L.L.C.

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HYDROGEOLOGIC STUDY REPORT

CONSENT ORDER NO. 31-07-02

Williamsburg Receiving and Storage L.L.C.

10190 Munro Road

Whitewater Township

Grand Traverse County, Michigan

INTRODUCTION

Background

The Williamsburg Receiving and Storage, LLC (WRS) Plant site is located north of the intersection of Angel and Munro roads, in Whitewater Township, Grand Traverse County, Michigan. The site is shown relative to geographic and cultural features on Figure 1 of the document "Work Plan Hydrogeologic Study and Report" (HSWP) which is included as an Attachment to this Hydrogeologic Study Report (Report).

The WRS Plant site had been the site of Gray and Company's Williamsburg Cherry Receiving (Brining) Station dating back (at least) to mid-1980's. Gray and Company applied for and received a Groundwater Discharge Permit (Permit # M-0086). Gray and Company's Permit Application considered that spent cherry brine would be diluted and then land applied by spray irrigation of land east of the current Plant location.

It is understood that Gray and Company never discharged wastewater in accordance with their Permit, yet cherries were received and brined throughout their ownership and operation. Cherry brining was undertaken in PVC-lined, earthen pits situated in groups to the south and east-northeast of the current Plant site and in a group location north of the current maintenance building site, where a storm water retention basin is currently situated. The latter battery of pits was reportedly operated during Gray and Company's ownership/operation, while the former two (2) pit areas were installed and operated by WRS for a period of three to five (3-5) years.

Brine utilized in the processing of cherries during Gray and Company's operation was reportedly manufactured from salt solids at an outdoor brine mixing station formerly located northeast of the existing Plant building. WRS never operated the outdoor brine mixing station, though they dismantled the tanks and mixing equipment in 2002. The location of the former brine mixing area is shown on Figure 1 of Appendix A in this Report. Locations of Gray and Company's pits are shown relative to the Plant site in the appendices of the HSWP, specifically Figure 1, Appendix A of this Report, where labeling indicates "REMOVED SEPTEMBER, 2002". *was use by WRS to Jan 04 1st cont*

WRS applied for and was granted a Groundwater Discharge Permit (Permit# M-00836) pursuant to Part 31 of the Natural Resources and Environmental Protection Act (NREPA) being Act 451 of 1994. The Part 31 Permit Application considered that brined cherry stemming and pitting would generate wastewater that would be distributed to various tracts of land surrounding the Processing Plant (Plant) through spray irrigation.

Review of the Permit Application reveals that the preparer sought to permit a gross effluent discharge annual volume essentially equivalent to the Plant's annual throughput (no permitted capacity for increased Plant production). The effluent was to be applied in two (2) seasonal application areas (spring-summer and fall-winter) with differing methods of land application.

The fall-winter discharge area included drip irrigation in an area occupied by cherry orchard, while the spring-summer discharge area was to be applied by spray irrigation in an area of fallow fields. WRS' Plant effluent was held pending discharge in an irrigation pond situated northeast of the Plant.

The Permit Application preparer sought a waiver of the hydrogeologic study requirements under Part 31's Part 22 Rules. In doing so, the Permit Application preparer applied for permissible wastewater hydraulic loading rates equivalent to natural precipitation rates for this region of northern Michigan.

WRS sought the assistance of Inland Seas Engineering, Inc. (ISE) in preparation of its Compliance Monitoring Reports (CMR), which are required quarterly reports under their Permit. In April of 2002, ISE noted anomalously elevated concentrations of sodium, chloride and phosphorous in effluent analytical results for a sample acquired by WRS staff. These anomalous results are documented in the first quarter CMR for 2002, since WRS discharged wastewater from the irrigation pond during eight (8) separate irrigation events that quarter. The CMR was submitted as was the requisite Permit Limit Exceedance Evaluation Report required under R323.2227(1) and the Permit general conditions.

The latter report included a plan for further evaluation of wastewater and its land application. This evaluation revealed that WRS had modified its plant production processes to include cherry finishing operations, beginning in January 2002. This resulted in generation of wastewater with characteristics similar to that which was applied during March of 2002. Further evaluation included acquisition of an effluent sample from the spray irrigation flow line as opposed to the pond sample acquired by WRS staff and verification of land application rates through flow measurement. ISE evaluation revealed that a very limited volume of effluent was applied to the land in excess of Permit limitations. No other discharges of wastewater have occurred at the site since ISE's evaluation. *Done*

Tens of thousands of gallons of irrigation pond wastewater was removed from the pond and trucked to the Reed City Wastewater Treatment Plant for treatment during the summer of 2002. *Sample acquired* In addition, the BOD once manifest in pond wastewater has been treated to non-detectable levels through aeration. Similarly, the dissolved solids content of pond wastewater has been diluted significantly through addition of precipitation over the past 15 months.

Purpose

A Hydrogeologic Study of the WRS operation areas was performed over a period of six months in 2003 pursuant to Consent Order (CO) No. 31-07-02 executed between the Michigan Department of Environmental Quality (MDEQ) and WRS in August of 2002. The purpose of the Hydrogeologic Study as stated within the CO was "...*determine the impact of*

brine pits and wastewater discharges on groundwater". These objectives were expounded upon through the Work Plan approval process, whereby the evaluation of the wastewater storage pond was also included as a requirement of conditional Work Plan approval.

In addition to the primary objective stated above, the CO required the HSWP be designed to meet the requirements:

- Meet the requirements of Rule; R 323.2221 of Part 22 Rules promulgated under Part 31 of the Natural Resources and Environmental Protection Act (NREPA),
- Include a proposed groundwater monitoring plan meeting the requirements of Part 22 Rules, specifically R 23.2223(2)
- Determine the nature and extent of contamination, if present, in the groundwater caused by the Facility's discharge and storage practices.
- Include a plan for characterization of water discharged to the collection basin east of the brine pits

The purpose of this Report is to present the findings from execution of the HSWP and address the objectives specified in Section IV(c.) of the CO and secondary objectives incorporated under Rule R 323.2221 and the HSWP approval process. The HSWP document is included as an Attachment to this Report, since its content satisfied many of the requirements under R 323.2221. The combination of this Report and its Work Plan will together

Rather than repeat particular information, the reader will be referred to a specific page and/or appendix in the HSWP for reference. Similarly, the methods of the HS will not be recited herein. Minor deviation from the HSWP is noted below where applicable. Deviation generally consisted of installation of temporary piezometers to map the water table potentiometric surface where this surface was proximal to grade. This allowed up-gradient and down-gradient monitoring wells to be placed without costly trial and error.

FINDINGS

Regional Hydrogeology

Two (2) reports were used as references to describe the regional geology and hydrogeology of the area. Excerpts of "*Hydrology and Land Use in Grand Traverse County, Michigan, U.S. Geological Survey, Water Resources Investigations Report 90-4122*" are provided in Appendix C of the Work Plan (Attachment 1). The second report is entitled "*Hydrogeological Study of a Proposed Irrigation Field for Gray and Company at Williamsburg, Michigan*" by Nordlund and Associates, Inc., September 1988 as well as a Supplement dated December 8, 1989 are provided in Appendix D of the HSWP. In addition, these reports are summarized on pages 3-5 of the Attached HSWP.

Current and Historical Land Uses

Land uses in the area are tabulated on Table 4 located on pages 21-22 of the excerpted United States Geological Survey (USGS) report in Appendix C of the Work Plan. The findings are also summarized on Page 4 of the Work Plan text.

Area Maps

Surface features including the only surface water body within ½ mile of the site (Tobeco Creek) is found on a map adapted from the Williamsburg, Michigan USGS Topographic Quadrangle Map and is found as Figure 1 Appendix A of Attachment 1. The locations of area water wells are plotted on Figure 3 of Appendix A of the Attached HSWP. **There is no existing or proposed Wellhead Protection Area in the vicinity of the WRS Plant.** These Rule required data elements also summarized on Page 3 in the body of the HSWP.

Site-Specific Geology and Hydrogeology

Topography

The western half and southern three-quarters of the site is comprised of a three-tiered terraced structure, (lower, intermediate, upper) with steeply sloping boundaries on most sides. The lower terrace comprises the southwest portion of the property and rises 15 to 20 feet above Angell and Munro Roads. The intermediate terrace is located to the north of and at an elevation of five (5) to ten (10) feet above the lower terrace. The upper terrace rises approximately 25 feet above the lower terrace to the east. The terrace elevations are roughly 630-635 feet, 640 feet, and 655 feet above mean sea level (AMSL).

Relatively steep slopes define the northern and eastern boundaries of the terraces, and give rise to rolling hills that increase in elevation to the north and east. To the northeast of the terraces is wastewater irrigation pond. The pond is approximately 190 feet wide by 400 feet long and over 20 feet in total relief. Regional topographic features may be observed from Figure 1 of the HSWP. Topography immediately surrounding the Plant is depicted on Figure 1 of Appendix A of this Report.

Soil Types

Generally, the surface and subsurface is composed largely of fine to medium grained sands and silty sands with interbedded clays and clay lenses. Sands are generally progressively coarser with depth and the clay units often contain small sand lenses. Stratum thicknesses of the sand and clay units are highly variable. Clay appears to be more predominant in the central region of the site, where soil borings encounter clay at less than ten (10) feet below grade to depths greater than 85 feet below grade in other areas. The clays are interpreted as ground and end moraine deposits and the sands as minor outwash deposits from glacial retrogression. This interpretation is consistent with observations performed by others on regional glacial ground forms.

Grain Size Analysis

Soil samples were transferred to ISE's materials testing laboratory where selective soil samples underwent grain size analysis via sieve and hydrometer methodologies. The results of grain size analysis from several samples collected from MW-102, MW-202, and MW-301 are provided in Appendix B of this Report. Soil samples from the unsaturated zone were sieved from depths of 0-2, 8-10, and 12-16 feet at the MW-102 location. Results indicate a fining in soil texture from the surface to a depth of 16 feet at this location. Soil samples sieved from MW-202 ranged from the surface to a depth of 20 feet and include both soils from the unsaturated and saturated zones. In MW-301, sieve analyses were performed on soil samples from depths of 24 to 32 feet below grade. The saturated zone was encountered at 26 feet below grade in this location.

Hydrometer analyses are performed on soils with grain sizes smaller than 200 microns. Hydrometers were performed on two (2) saturated soil samples, one from MW-301 at a depth of 36-37 feet and the second from MW-402 at a depth of 49-50 feet. These soils were classified by visual means as silty clay and clay, respectively. Hydrometer testing confirmed the classification of the MW-301 sample as silty clay as over 98% of the sample was silt size or smaller. The soil sample from MW-402 had a more variable grain size distribution as approximately 50% of the sample was classified as a medium to fine sand with the remaining 50% classified as a silt, clay, or colloids (particles smaller than clay and held in suspension during the hydrometer analysis).

Soil Borings

Twenty (20) soil borings were advanced as part of this hydrogeological investigation by manual, direct-push, and hollow stem auger drilling methods. Excluded from this count were five (5) soil borings (SB-1A to SB-5A) that were advanced in 2002 within each of the spray irrigation application areas (see Figure 6, Appendix A Work Plan). Some borings were terminated because of refusal (i.e. SB-201 and SB-302) or advanced deeper to find a lower confining layer as at SB-202.

Soil boring logs are provided in Appendix E of this Report. Soil boring logs for SB-1A through SB-5A are found in Attachment 1, Appendix E of the HSWP. Discrete soil sampling was performed in the direct-push and auger advanced borings both in the unsaturated and saturated zones. Discrete soil samples were collected via split barrel samplers. Acetate liners were utilized for sampling soils by direct push methods. Depths of the borings ranged from about eight (8) feet to a maximum of 101 feet.

Transmissive Characteristics of the Unsaturated Zone

Infiltration rates and depths were calculated based upon soil samples obtained from the spray irrigation areas. Vadose zone soil samples were also analyzed for chloride content. Theoretical and analytical results were in agreement with the depth of infiltration determined to be in the range of 5 to 12 feet below grade. Please refer to pages 2-5 of Appendix E of the Attached HSWP for details concerning the infiltration assessment.

The physical characteristics of the soils and their areal extent are described in the soil boring logs found in Attachment 1, Appendix E of the Work Plan, in the monitor well logs for MW-601 and MW-602 in Appendix E of this Report, and in the site profiles found in Appendix B of this Report. Depth to groundwater in the former irrigation area is at least 50 feet below grade.

Stratigraphy

Hydrogeologic Cross Section were constructed from soil boring logs in an effort to better understand the subsurface hydrogeologic conditions. Profile trace line orientation were selected in a manner approximately parallel and perpendicular to the strike of subsurface hydrogeologic features, such as clay structures or groundwater flow potential. The profile lines are shown on Figure 1 in Appendix A of this Report, while Hydrogeological Cross Sections A-A' through D-D' are found in Appendix B of this Report. The site stratigraphy detailed in the four (4) profiles is discussed below.

Profile A – A'

This profile is situated from the southwest corner of the site (near the intersection of Angell and Munro roads) northeastward terminating in the area near the western edge of the irrigation pond. Clays at various depths and thicknesses are evident in each of the monitor wells depicted in this profile. Significant clay soil horizons were observed at MW-201, MW-102, and MW-302 with lesser deposits at other well locations. The most significant feature on this profile is a large clay body that underlies the northern brine pits and extends westerly, down the slope to at least below the parking lot area (the area between MW-101 and MW-102) to the southwest. The total thickness of this clay in the area of the northern brine pits is not known because MW-302 was terminated at a depth of 24 feet while still in the clay.

This clay deposit or strata related to this deposit appear to form an upper confining layer for the groundwater that is present in the area of MW-101 and MW-102. Basal clay confining layers were logged in MW-202 and MW-301 that may be part of the base of the large clay deposit. A separate upper clay confining layer was logged in MW-201 near the southwest margin of the site.

Profile B – B'

This profile is oriented in a slightly northwest to southeast position in the area of the processing plant extending to the clustered background wells (BKG-S and BKG-D), just north of Angell Road. In contrast to the area shown in Profile A-A', considerably less clay was observed in the upland areas of Profile B-B'. A basal clay was logged in MW-402 which is depicted as the same clay unit logged in MW-202. The boring for MW-102 terminated just above where this clay layer is projected to exist. The upper clay in MW-102 is thought to be the southwestern extension of the major clay body shown in Profile A – A'.

Profile C – C'

This profile is parallel and to the east of Profile A-A'. Included in this profile are a former monitor well (MW-F) and former soil boring (SB-3) from the 1989 investigation for the Hydrogeological Study Supplement prepared by Nordlund and Associates, Inc. This profile extends from the area just northeast of the irrigation pond southwestward terminating near the

southern end of the southern brine pits adjacent to Angell Road. The significant feature is the clay "plug" structure centered at SB-3 and its "toe" shown at MW-F. No groundwater was encountered at SB-3.

Profile D – D'

This profile is located approximately parallel and to the north of Profile B-B'. This profile depicts both the clay deposit noted in MW-302 in Profile A-A' and the clay "plug" structure noted in SB-3 in Profile C-C'. This is interpreted as one undulating clay deposit as shown. The undulated surface is likely the result of glacial or fluvial scour. The difference in groundwater elevations at MW-F and MW-302 may be related to the presence of saturated sand units intercalated with the clay deposit at MW-302.

Groundwater Gradients and Flow Potential Directions

A Groundwater Elevation Summary Table is presented in as Table 1 in Appendix D of this Report. Figure 2 of Appendix A of this Report is a Groundwater Flow Potential Map with interpreted potentiometric surface contours and flow potential directions, as determined on October 20, 2003. The underlying clay body that appears most prominently in Profiles A – A' and D – D' affects the site groundwater flow potential. The area of highest groundwater elevation is found at MW-302 where significant clay was found at an elevation above 640 feet.

Groundwater gradients are the greatest along the sides of this structure (heading northwest and southeast), ranging from 4.0% to 7.0%. To the northeast, the groundwater potentiometric surface is relatively flat, with an average gradient of approximately 0.4%. To the southwest, the groundwater gradient is approximately 2.5%. The groundwater plateau is likely attributable to this shallow clay "plug" structure encountered in this area.

In the northwestern reaches of the site, in the vicinity of piezometer wells PZ-2 and PZ-3, groundwater flow potential directions range from southeast to southwest, with hydraulic gradients from 4.0% to 8.5%. In the eastern reaches of the site, in the area of a former spray irrigation system and monitoring wells MW-601 and MW-602, groundwater flow potentials are west-southwest, with an average gradient of approximately 0.1%. Groundwater flow potentials will be discussed in more detail below under the section "Hydrogeologic Target Study Areas".

A cluster well configuration (BKG-D & BKG-S) is located along the southern margin of the site. Groundwater elevations in these wells show an upward vertical gradient, indicating a slight artesian effect in this area. Two generalized groundwater potential directions were identified in the Norlund and Associates site investigation. In the south half of the site, groundwater flow potential was to the south. In the northern part, groundwater potential was to the north. These directions were determined using a more limited number of monitor wells than the current HS. The added potentiometric data from monitoring points east and west of the prior study area result in improved understanding of the regional potentiometric surface.

Aquifer Hydraulic Conductivity

Values of aquifer hydraulic conductivity obtained were based on pump test drawdown data and boring logs from the September 1988 Hydrogeological Study prepared by Nordlund and Associates. A copy of this report is provided in as Appendix D in the Work Plan.

For unconfined aquifers, hydraulic conductivity can be calculated using the following equation from Driscoll (1986), p. 215:

$$K = \frac{1055Q \log r_2 / r_1}{(h_2^2 - h_1^2)}$$

(equation 1)

where

- K = hydraulic conductivity of the water bearing formation in gpd/ft²
- Q = pumping rate in gallons per minute (gpm)
- r_2 = distance to farthest observation well in ft
- r_1 = distance to nearest observation well in ft
- h_2 = saturated thickness at the farthest observation well in ft
- h_1 = saturated thickness at the nearest observation well in ft

Q is 21.4 gpm as reported in the September 1998 hydrogeological study. Values for r and h were obtained from observation wells "B" and "C" in the report, with B and C located at distances of five (5) feet and 33 feet, respectively, from the pumping well. Based on boring logs, the aquifer in the area of the pump test is bounded below by a two (2) foot thick clay layer. Assuming that this clay is the lower boundary of the aquifer, the initial saturated thickness is about 14 feet. From this, values for h_1 and h_2 are obtained by subtracting the maximum drawdown at each well location, yielding saturated thicknesses of 13.06 feet and 13.72 feet, respectively, for h_1 (at well B) and h_2 (at well C). Inserting these numbers into equation 1 yields:

$$K = \frac{1055(21.4) \log(33/5)}{(13.72^2 - 13.06^2)} = 1,050 \text{ gpd} / \text{ft}^2$$

K can also be estimated based on particle size and uniformity coefficients obtained from sieve analysis and soil density estimates from standard blow counts. The procedure for estimating hydraulic conductivity using this method is described in Driscoll (1986), p. 738. Sieve analysis data performed by ISE is provided in Appendix F of this Report. This data shows a D_{50} particle size range of about 0.3 mm to 0.5 mm, with uniformity coefficients of about 2.25 to 3.8, yielding values for hydraulic conductivity between 530 gpd/ft² and 1,490 gpd/ft² and an average value of 800 gpd/ft². The following formula can also be used to estimate hydraulic conductivity using transmissivity:

$$K = \frac{T}{b}$$

equation 2

where

K = hydraulic conductivity of the water bearing formation in gpd/ft²
 T = transmissivity in gpd/ft
 b = saturated thickness of the aquifer in ft

Based on a saturated aquifer thickness of 14 feet and a transmissivity of 13,780 gpd/ft as calculated in the September 1988 hydrogeological study:

$$K = \frac{13,780}{14} = 980 \text{ gpd/ft}^2$$

These three (3) methods for determining hydraulic conductivity are in close agreement. Although clay lenses and seams are present and distributed intermittently, soil logging shows similarity of aquifer materials throughout the site (primarily fine to medium sands). These observations suggest that the value of hydraulic conductivity obtained from the pump test data (1,050 gpd/ft²) is generally valid over the extent of the site.

Groundwater Flow Velocity

As determined from groundwater potentiometric surfaces, hydraulic gradients at the site range from 0.1% to 8.5%. The following equation from Driscoll (1986), p. 83 was used to determine groundwater flow velocities:

$$V = \frac{\frac{K(h_1 - h_2)}{L}}{\eta \cdot 7.5} \quad \text{equation 3}$$

where

V = groundwater flow velocity in ft per day
 K = hydraulic conductivity in gpd/ft²
 η = porosity of aquifer material
 7.5 = conversion factor for gallons to ft³

$\frac{h_1 - h_2}{L}$ = hydraulic gradient (dimensionless)

Using the calculated hydraulic conductivity value of 1,050 gpd/ft², a standard porosity of 39% for fine to medium sand, and minimum and maximum hydraulic gradients of 0.1% and 8.5%, respectively, the minimum (V_{min}) and maximum (V_{max}) groundwater flow velocities are as follows:

$$V_{min} = \frac{1,050(0.001)}{0.39(7.5)} = 0.36 \text{ ft/day}$$

$$V_{\max} = \frac{1,050(0.085)}{0.39(7.5)} = 31 \text{ ft/day}$$

Groundwater potentiometric surface maps show that groundwater flow velocities will be toward V_{\min} in the southeastern and northeastern reaches of the site and toward V_{\max} in the central and western portions of the site.

Monitor Wells, Piezometers, and Hand Auger Wells

Monitor well, piezometer, and hand auger well construction records are provided in Appendix E of this Report. Wells were installed in seventeen (17) borings advanced by hand auger, direct-push, and auger drilling methods. The wells were constructed using two-inch PVC risers and screens. Screen length is five (5) feet. The annulus was backfilled with a combination of filter sand, bentonite, native soil, and concrete to the surface. Several wells were secured by placing a well cap and a casing protector around the casing. Filter sand pack was placed around the screen extending from the bottom of the screen to one to two feet above the screen.

A bentonite layer of approximately one-foot thickness was then placed above the filter sand with a second bentonite layer placed near surface, below the frost line to prevent surface water from migrating directly to groundwater through disturbed annular soils. In addition, bentonite was used to seal any clay horizon penetrated below the water table.

Most of the wells were screened intersecting or slightly below the top of the upper-most saturated zone. An exception is at MW-301 where the base of the five (5) foot screen is installed on a clay layer at a depth of 36 feet below grade and about ten feet below the water table. Subsequent to each well installation, the aquifer was developed with either a bailer or a pneumatics-powered bladder pump.

Groundwater Sampling, Analysis, and Results

Groundwater from monitor wells installed as part of this hydrogeological investigation was sampled and analyzed from five (5) different sampling events. Groundwater was first sampled in late May, in early June, and October 20 and 30, 2003. HAW-4, installed and initially sampled on October 30, 2003 was also sampled a second time on November 12, 2003.

The groundwater samples were transported to SOS Analytical Laboratories in Traverse City where they were analyzed for chloride concentrations via EPA Method 325.2. The laboratory analytical reports are provided in Appendix F. The results are also tabulated and appear as Table 2 in Appendix D of this Report.

Chloride concentrations ranged from one (1) milligram per liter (mg/L) to about 500 mg/L over the site. Two (2) wells, MW-201 and MW-401, where elevated levels of chlorides were detected, are located in proximity to Angell Road. The locations of these wells are near the base and top, respectively of a steep road grade that is reportedly heavily salted to prevent icing during the winter. The chloride concentration results are also presented based upon a targeted geographic focus below. Elevated levels of chloride ions were also observed in groundwater from MW-10, which is situated near the former Gray and Company brine mixing station.

Outfall Sampling Results for Storm Water Retention Basin East of Southern Brining Pits

The following table summarizes the results from sampling efforts included in the HSWP for this CO HS Report element:

	Outfall Sampling Results- Brining Pit Area					
		Analysis	North Pipe	South Pipe	North Pipe	South Pipe
	Units	Method	05/05/03	05/20/03	06/10/03	07/10/03
BOD ₅	(mg/L)	405.1	< 67	57	12	27
Chloride	(mg/L)	325.2	6	4	3	5
Phosphorous (Total)	(mg/L)	365.4	0.96	0.25	0.21	0.08
Sodium	(mg/L)	273.1	5.06	2.59	5.0	13.4

Appendix G of this Report contains the daily logs associated with this CO requirement.

CONCLUSIONS

Outfall Sampling Results for Storm Water Retention Basin East of Southern Brining Pits

The data tabulated above were provided to MDEQ in an August 7, 2003 letter from ISE. MDEQ Staff responded by stating that BOD is "elevated above storm water levels". The data submitted in ISE's August 2003 letter to MDEQ is derived from compliance activities required under Section 4.1(c).(1).(iv.) of the CO and met the explicit requires of the CO. ISE concludes that the preponderance of these data do not indicate any contribution of brining or transfer operations upon storm water quality. The specific chemical characteristics indicative sodium/calcium chloride brine is not evident in any of the sample analytical results.

ISE does not have access to any database containing BOD analyses for storm water for this region or this land use scenario that would allow us to confirm or refute MDEQ's observations regarding the relative levels of BOD in storm water. It would seem from a purely mathematical standpoint that such a database would be required for objective evaluation of BOD analytical results for storm water. In absence of analytical results affirming a chemical specific fingerprint with that of cherry brine, we have concluded that there is no evidence of impact of these operations upon storm water discharged to these basins. Further evaluation of this area is discussed below with other recommendations.

Hydrogeologic Study Target Areas

Monitor wells were installed in areas deemed up-gradient and down-gradient of wastewater discharge locations and current and historic brining pit locations to “*determine the impact of brine pits and wastewater discharges on groundwater.*” In addition, two (2) cluster background wells and three (3) piezometer were installed. The background wells, shallow and deep, (BKG-S and BKG-D respectively), are located on the north side of Angell Road between the 400 and 600 series wells.

The purposes of the clustered wells installations were to determine a vertical hydraulic gradient (if any) within the aquifer and to provide background chloride concentration data for the site. The piezometer were installed in the former northwest brine pit area to ascertain the direction of flow potential in this area due to its presence at shallow depths. This allowed correct placement of monitoring wells without costly trial and error methods.

Specifically, the areas targeted in this Report and their relevant wells are:

- Former Spray Irrigation Area – Monitor Well 600 Series
- Storage Lagoon Area – Monitor Well 500 Series
- Northeast Active Brine Pit Area – Monitor Well 300 Series
- Southeast Active Brine Pit Area – Monitor Well 400 Series
- Northwest Former Brine Pit Area – Piezometer and Hand Auger Well Series
- South Central Former Brine Pit Area – Monitor Well 100 Series
- Southwest Former Brine Pit Area – Monitor Well 200 Series

Former Spray Irrigation Area

The evaluation of the vertical and horizontal extent of mounding due to an irrigation discharge in this area is reported in Appendix E of the Attached HSWP. Appendix E is entitled “Hydrogeological Assessment Report WRS Spray Irrigation Areas July 2002”. The findings of the July 2002 investigation determined that there was no impact to groundwater due to irrigation operations. This was determined through laboratory evaluation of soil samples containing moisture from percolating wastewater and precipitation.

This conclusion was confirmed by the installation and groundwater sampling of MW-601 and MW-602 in October 2003. In compliance with the MDEQ request offered through conditional HSWP approval, MW-601 was installed in a topographically low area where possible surface run-off may have ponded prior to infiltrating the soils. Chloride concentrations in MW-601 and MW-602 averaged less than 10 mg/L when sampled in October 2003.

No impact to groundwater quality whatsoever is evident from the eight irrigation events this area received in spring of 2002. The evaluation has been comprehensive in that soil and groundwater have been analyzed with a biased sampling strategy. The bias applied is toward detection of the conservative tracer chemical, chloride.

Storage Lagoon Area

MW-501 and MW-502 were installed on the northeast and southwest ends of the lagoon, respectively. The lagoon may lie on the northeast extension of the groundwater divide adjacent to MW-302. Groundwater in the area of the lagoon may flow southwesterly (toward MW-502) or, at a very low rate toward the northeast and MW-501. Chloride concentrations in the groundwater of MW-501 and MW-502 averaged 47 mg/L and 10 mg/L, respectively in October 2003.

No impact to groundwater quality is evident from the evaluation of groundwater quality or potentiometric surface elevation in this area. There do not appear to be any anomalous gradients indicative of a leaking pond liner, nor does groundwater quality appear to contain significant concentrations of the dissolved solids present in irrigation pond wastewater.

Northeast Active Brine Pit Area

Monitor wells 301 and 302 (MW-301 and MW-302) were installed at the northwest and southeast sides (respectively) of these brine pits. As can be seen on the Groundwater Flow Potential Map, Figure 2 Appendix A of this Report, the area of highest groundwater elevation over the entire site is found adjacent to MW-302. The Northeast Brine Pits are interpreted to lie between groundwater highs at MW-302 and PZ-3. Groundwater below the majority of these brine pits is interpreted to flow in a northwesterly direction from the MW-302 high area before refracting and flowing in a southwesterly direction, toward HAW-1.

The chloride concentration in the groundwater of MW-302 averaged about 15 mg/L. Concentrations of chloride at MW-301 averaged about 140 mg/L. Average chloride concentration at HAW-4 is less than 170 mg/L. No impact to groundwater quality is evident as result of brining pit operations in this area.

Southeast Active Brine Pit Area

Monitor wells 401 and 402 (MW-401 and MW-402) were installed at the south and north ends respectively of these brine pits. As can be seen on the Groundwater Flow Potential Map, Figure 2 of Appendix A of this Report, the area of highest groundwater elevation trends northeast-southwest and lies between the northeast and southeast active brine pit areas. Groundwater is interpreted to flow southeasterly off this high and then refract southerly to slightly southwesterly (toward MW-401) below the Southeast Brine Pits.

Groundwater chloride concentration averaged about 55 mg/L at MW-402 and about 320 mg/L at MW-401. As stated above, MW-401 is located near the top of a steep grade on Angell Road that is salted heavily for de-icing purposes each winter. No impact to groundwater quality is obvious as result of brining pit operations in this area. Slightly elevated (relative to the secondary drinking water standard) levels of chloride is likely due to run-off from road salting activities, since the concentration of chloride ions is well below the levels present in cherry brine. Further evaluation of road de-icing operations is included in the recommendations below.

Northwest Former Brine Pit Area

A portion of this area is now a storm water retention pond, though was used during Gray and Company's operation of the site. Hand auger monitor wells and piezometer wells were installed in this area. They include HAW-4 and piezometer wells 1, 2, and 3 (PZ-1, PZ-2, and PZ-3). MW-301, MW-302 and MW-101 also lay up-gradient of these former pits. As can be seen on Figure 2 Appendix A, these former northwest brine pits occupied a large area between the two groundwater elevation highs adjacent to MW-302 and PZ-3. Groundwater is interpreted to flow in a southwesterly direction in this area.

The chloride concentration at the up-gradient wells, MW-301 and MW-101 averaged about 140 mg/L and over 300 mg/L, respectively. The chloride concentration at the down-gradient well, HAW-4 near the western property boundary, was found to average 157 mg/L. Road de-icing operations on the public thoroughfares do not likely contribute to the elevated chloride concentrations observed at the MW-101 location. Monitoring well HAW-4 is situated at a location down-gradient of MW-101.

Though its location is proximal to the former Gray and Company brine mixing station, it is also proximal to a steep grade leading up to the active north and south brining pit areas. Evaluation of de-icing operations on this private drive is warranted as is the evaluation of a potential brine or bulk solids release from the former brine mixing station area. These pits were formerly operated by Gray and Company. WRS undertook dismantling of these pits in September of 2002. Soil sampling was conducted in August of 2002 to evaluate the potential impact of the pit operations by Gray and Company. The soil sampling locations were selected from a random statistical sampling plan. No evidence of impact was detected. Further evaluation of this area is included in recommended monitoring plan below.

South Central Former Brine Pit Area

Monitor wells, MW-101 and MW-102 were installed at the north and south ends, respectively, of these former brine pits. As can be seen on Figure 2 of Appendix A of this Report, these former pits are located on the leading edge of the groundwater elevation high centered adjacent to MW-302. MW-302 may be considered up-gradient of these former pits. The predominant direction of groundwater flow potential below these former brine pits is interpreted to be southwesterly, toward MW-202. Groundwater flow potential away from MW-101 is discussed immediately above.

Chloride concentrations at MW-101 and MW-102 averaged about 300 mg/L and 10 mg/L, respectively. As noted above, the chloride concentration in the groundwater of MW-302 averaged about 15 milligrams per liter (mg/L). As described below, chloride concentrations down-gradient of this former brining pit area in MW-202 are less than 10 mg/L. No impact to groundwater quality is evident as result of historic brining pit operations in this area.

Southwest Former Brine Pit Area

The brining pits formerly located in this area were installed by WRS and operated less than 5 years, before decommissioning in 2001. The area is now utilized as an employee parking lot. MW-201 and MW-202 were installed on the southwest and northeast sides of these former brine pits. The difference in groundwater elevation is over twelve (12) feet in these two wells. The groundwater flow potential is interpreted to be southwest in this area of the site.

The groundwater chloride concentration averaged about 500 mg/L and 1 mg/L in MW-201 and MW-202, respectively. As stated above, MW-201 is located near the bottom of a steep grade on Angell Road that is salted for de-icing purposes in the winter. Conclusions regarding impacts to groundwater quality as a result of historic brining operations in this are not immediately evident. While somewhat elevated relative to drinking water standards, chloride concentrations are well below those levels indicative of released brine. Evaluation of chloride ion contribution from road de-icing operations are necessary to determine the contribution from this annual, season-long source of groundwater impact.

Groundwater Aquifer Status

Groundwater depths are highly variable across the site, due largely to changes in topography and soil textures that occur with significant spatial frequency, laterally and with depth, both without an apparent discernable trend. Groundwater depths vary from less than five (5) feet to more than fifty (50) feet below grade. Groundwater elevations in certain locations appear to be anomalously high or low, and is likely attributable to the variable distribution of clay structural units.

Where sufficient saturated thickness is present, the uppermost groundwater unit is considered at present to be a "usable aquifer" as defined in Rule R 323.2203(k), under Part 22 rules. The aquifer thicknesses are not well defined as the basal units are not evident in each boring where significant saturated zone is present. The areas where a useable aquifer exist include the areas east of the active north and south brining pit areas and perhaps the area in the vicinity of the new storm water retention basin.

Areas where an unusable aquifer is present may include the beneath the active brining pits where clay strata and anomalous groundwater elevations are present. It is not possible to reach conclusions, conservatively regarding this definition, at present. Despite the apparent groundwater divide and significant thicknesses of clay soils, the perched and artesian saturated zones are at elevations suggesting that they may be hydraulically connected to usable aquifers. This potential hydraulic connection depends upon the lateral persistence and continuity of permeable soils, which is difficult to verify given the frequently observed spatial variability in the subsurface.

GROUNDWATER MONITORING PLAN

Rationale

Groundwater monitoring is proposed solely for further evaluation of anomalous chloride levels detected adjacent to:

- ❑ Angell and Munro Roads (MW-401 and MW-201), and
- ❑ The former Gray and Company brine mixing station

In addition to these areas, monitoring is proposed as part of the evaluation of migration potential for chlorides down-gradient from MW-101 in the vicinity of the former Gray and Company Former Northwest Brining Pit area.

Groundwater monitoring is not required under the effective Groundwater Discharge Permit. The Permit discharge limitations for hydraulic loading are extremely low, given the soil textures present. The Permit limitations for chemical constituents are set at the Rule R 323.2222 limiting values, which are conservatively established to ensure that groundwater quality degradation will not occur as result of the permitted wastewater discharge.

Further, WRS intends to issue future discharges through batch processing. Future discharges from the pond will be batched with sufficient fresh water so as to dilute the dissolved solids remaining in pond water to levels at or below Permit limitations. Each batch will be analyzed prior to discharge to assure dilution is appropriate. Prior to discharging, WRS intends to notify MDEQ, as required under Part 31 and associated rules, of its intended process changes. When process changes are sufficiently developed and effluent sampling demonstrates uniformity in character, WRS will seek either a permit modification or revised permit through the renewal administrative process.

The rationale for monitoring offered above is further supported by the fact that most requirements under Rule R 323.2223 for a groundwater monitoring plan flow from sub-rule (3), which includes the preamble, "*At the time of application for a permit under R 323.2218,*". The requirements under sub-rule (3) clearly flow from the planned wastewater discharge. Permitted wastewater discharges under WRS' operations have not required a groundwater monitoring program and the recent evaluation through the HS indicate that no impact to groundwater quality has occurred from their permitted discharge, even when it modestly exceeded permit effluent limitations.

The sources of chloride impact to groundwater quality are not evident from the execution of the HSWP, though clearly these do not result from permitted wastewater discharges. No inventory losses have occurred at the WRS Plant site during WRS' operations. Therefore, evaluation of groundwater quality from prior operations is prudent, as is the evaluation of chloride sources unrelated to cherry processing operations.

Monitoring Plan

Groundwater monitoring will be conducted on a quarterly basis and will include acquisition of static water levels from all monitoring wells and piezometers installed at the site. In addition to gauging water levels, groundwater samples will be acquired from MW-101, HAW-4, MW-201 and MW-401. Samples will be analyzed for major anions and cations as well as any conservative chemical tracer that may be found in fresh or spent cherry brine or common road de-icers. All laboratory analytical methods will conform to requirements set forth in Rule R 323.2220(3) with laboratory detection limits meeting or exceeding requirements under R 323.2220(4).

In addition to groundwater monitoring and detailing the geochemical make-up of groundwater, an evaluation will be undertaken to establish the contribution of road salt anions and cations to groundwater quality, both from public thoroughfares and from the WRS access road. This will be accomplished through sampling and characterization of solids applied to roadways and by characterizing the run-off direction, magnitude and chemical composition.

In this manner, more definitive conclusions may be obtained regarding the anomalous chloride concentrations detected along Angell Road and the WRS upper-terrace drive during the recently completed Hydrogeologic Study.

Prepared by:

INLAND SEAS ENGINEERING, INC.



Andrew Smits, B.E.
Geological Engineer

HYDROGEOLOGIC STUDY REPORT

CONSENT ORDER NO. 31-07-02

Williamsburg Receiving and Storage L.L.C.

10190 Munro Road

Whitewater Township

Grand Traverse County, Michigan

HYDROGEOLOGICAL STUDY REPORT

CONSENT ORDER NO. 31-07-02

Book 1 of 2

APPENDIX A

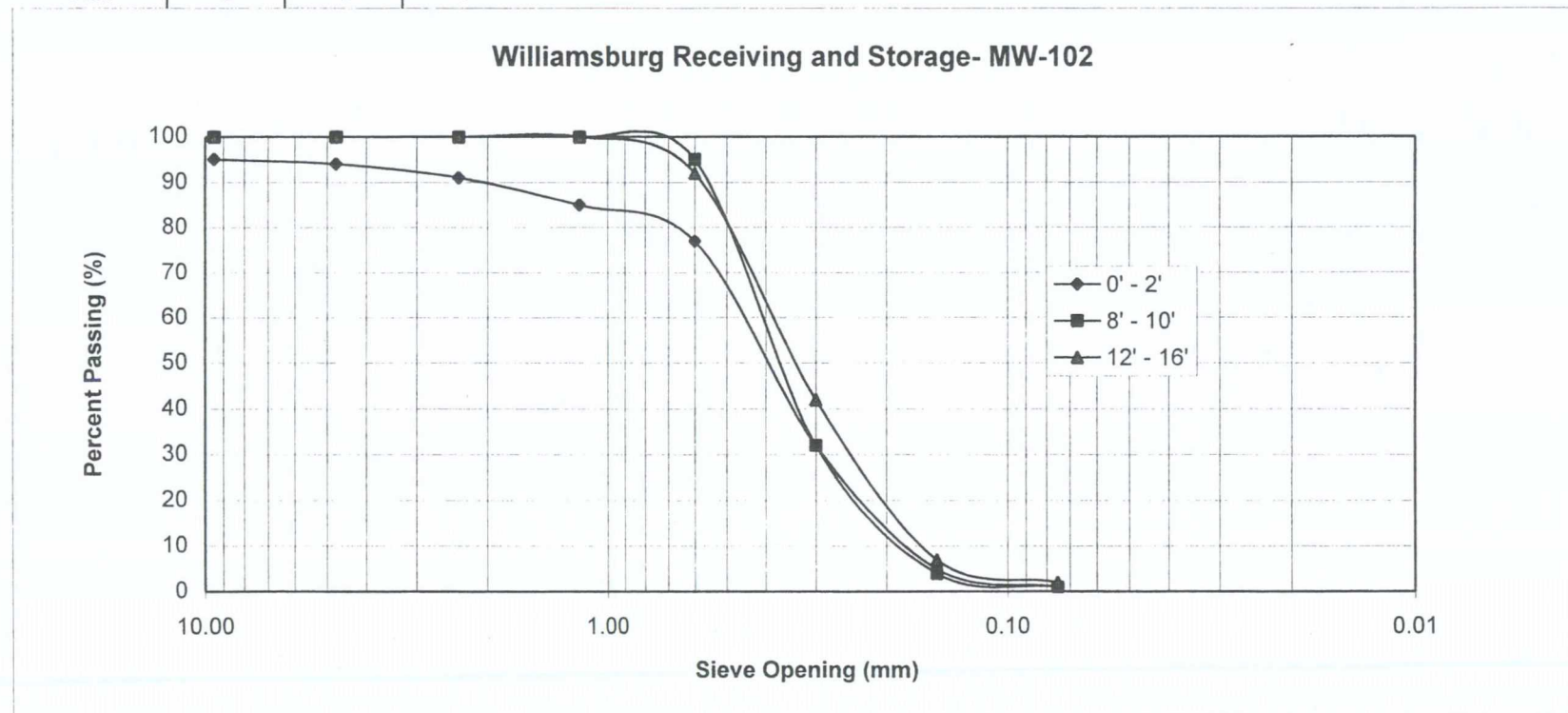
FIGURES

APPENDIX B

SOIL GRADATION TESTING RESULTS

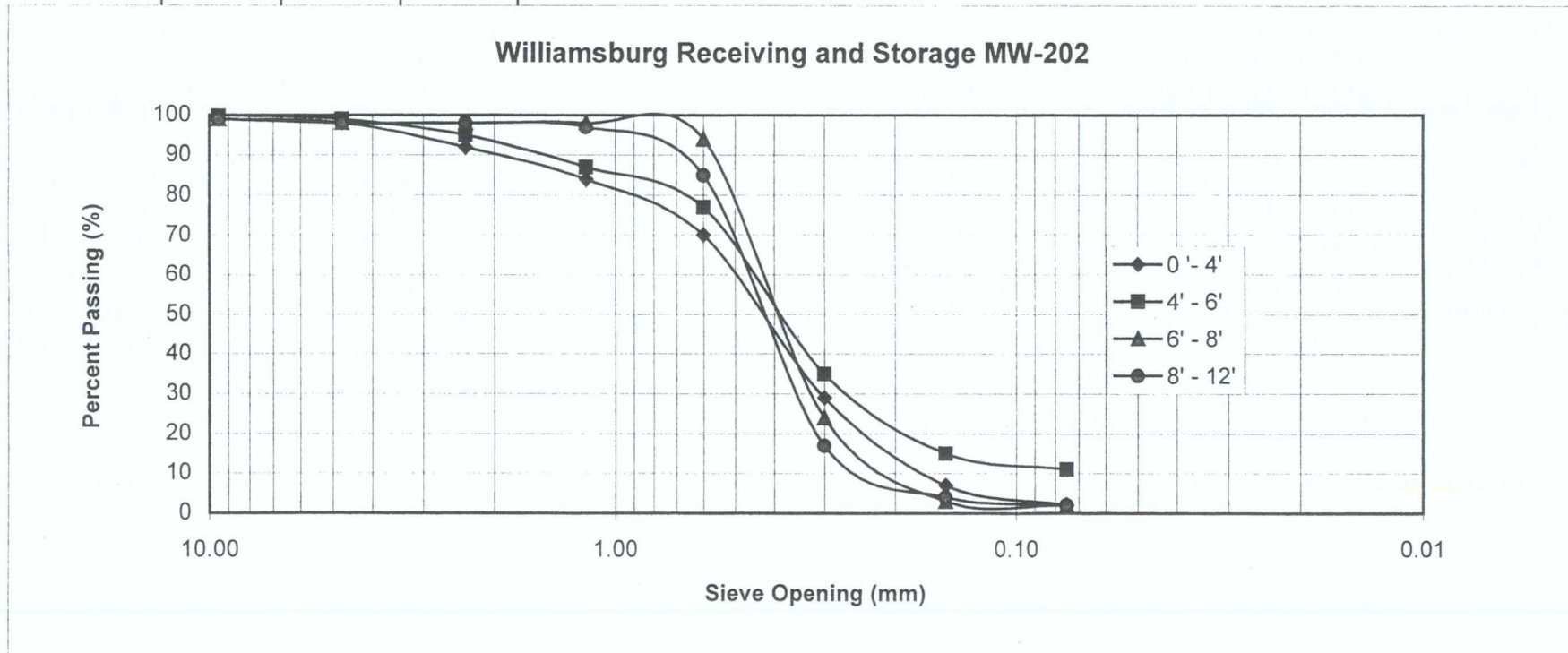
Williamsburg Receiving and Storage, LLC
 10190 Munro Road
 Williamsburg, Michigan
 ISE Project #02633061-29E

Sieve (mm)	0' - 2'	8' - 10'	12' - 16'
9.50	95	100	100
4.75	94	100	100
2.36	91	100	100
1.18	85	100	100
0.60	77	95	92
0.30	32	32	42
0.15	5	4	7
0.08	1	1	2
Pan	0	0	0



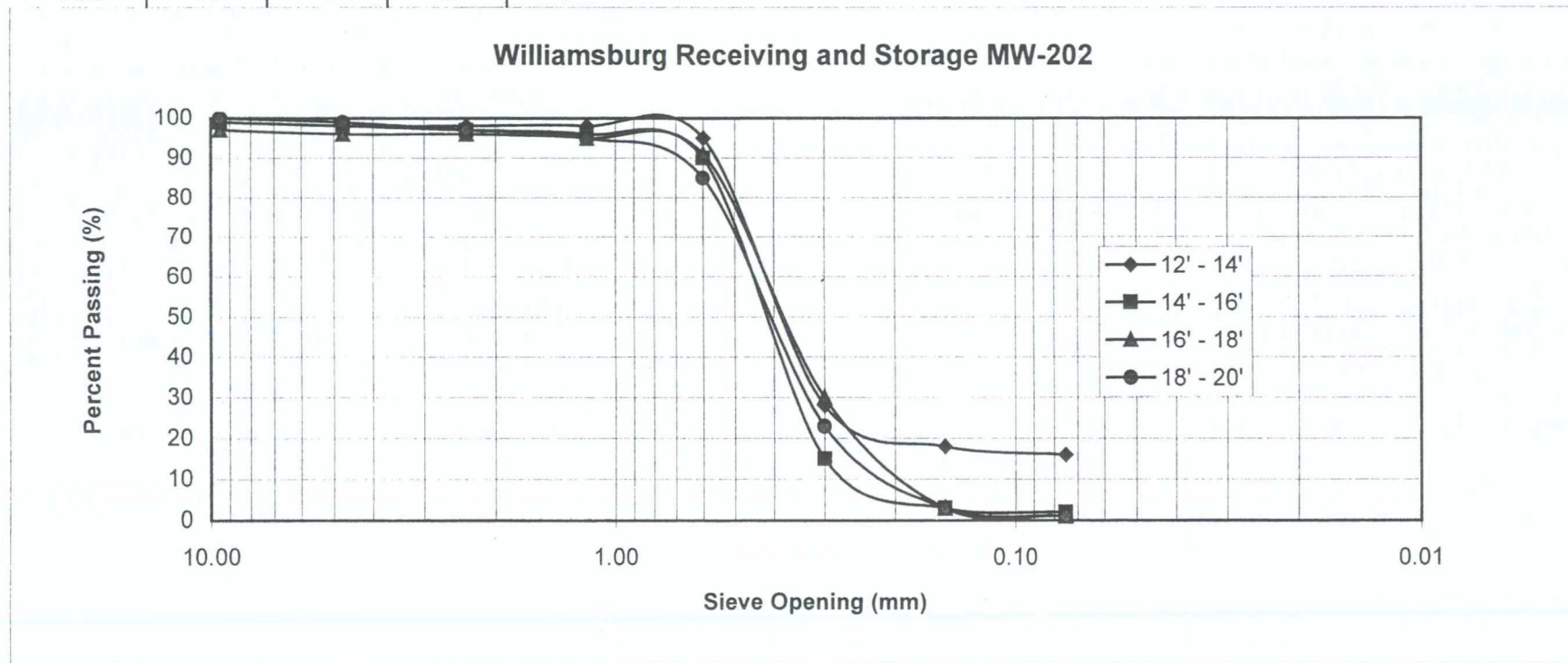
Williamsburg Receiving and Storage, LLC
10190 Munro Road
Williamsburg, Michigan
ISE Project #02633061-29E

Sieve (mm)	0' - 4'	4' - 6'	6' - 8'	8' - 12'
9.50	99	100	99	99
4.75	98	99	98	98
2.36	92	95	98	98
1.18	84	87	98	97
0.60	70	77	94	85
0.30	29	35	24	17
0.15	7	15	3	4
0.08	2	11	2	2
Pan	0	9	1	0



Williamsburg Receiving and Storage, LLC.
 10190 Munro Road
 Williamsburg, Michigan
 ISE Project #02633061-29E

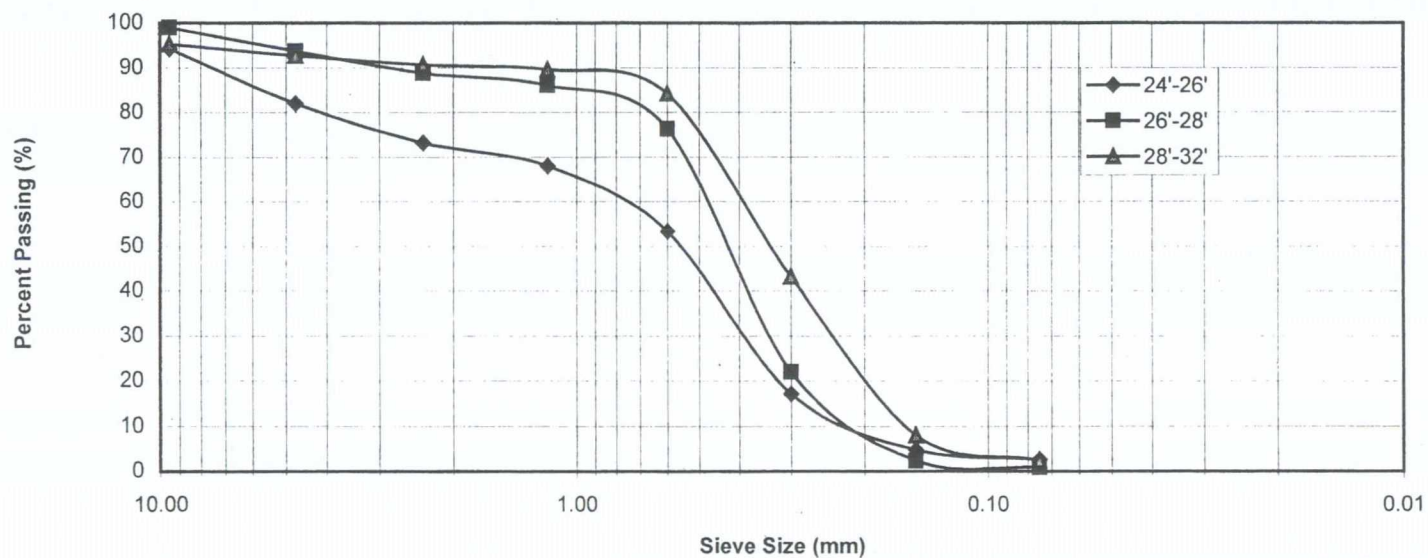
Sieve (mm)	12' - 14'	14' - 16'	16' - 18'	18' - 20'
9.50	99	99	97	100
4.75	98	98	96	99
2.36	98	97	96	97
1.18	98	96	95	95
0.60	95	90	91	85
0.30	28	15	30	23
0.15	18	3	3	3
0.08	16	2	1	1
Pan	15	0	0	0



Williamsburg Receiving and Storage, LLC
 10190 Munro Road
 Williamsburg, Michigan
 ISE Project #02633061-29E

Sieve (mm)	24'-26'	26'-28'	28'-32'
9.50	94	99	95
4.75	82	94	93
2.36	73	89	91
1.18	68	86	90
0.60	53	76	84
0.30	17	22	43
0.15	5	2	8
0.08	3	1	2
Pan	0	0	0

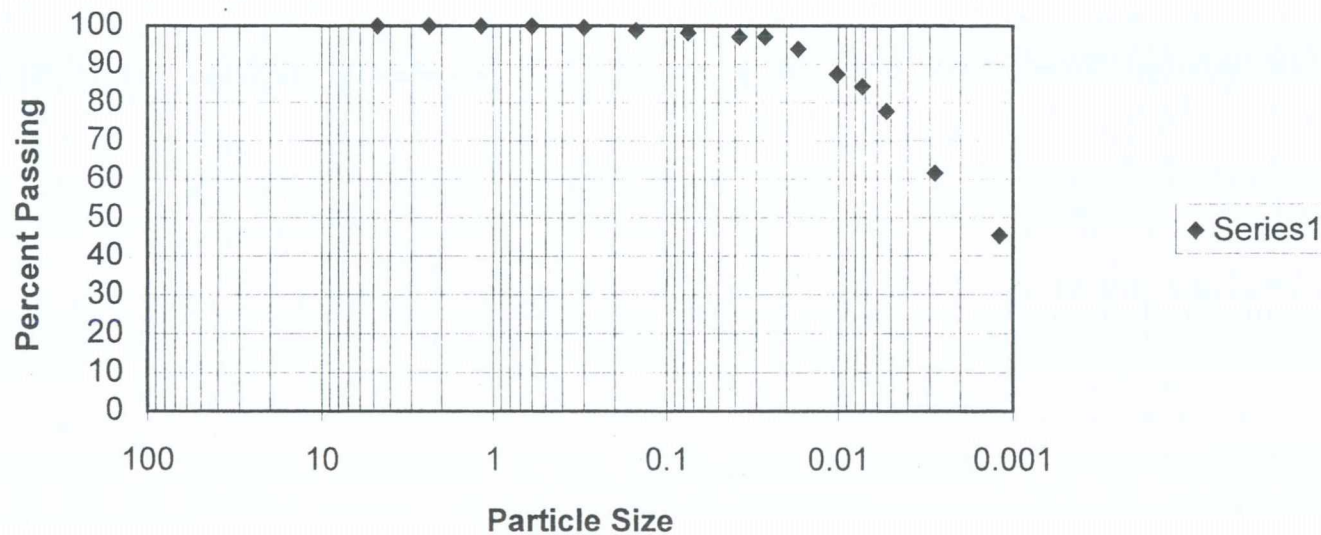
Williamsburg Receiving and Storage Soil Grain Size Analysis- MW-301



Williamsburg Recieving and Storage, LLC
10190 Munro Rd.
Williamsburg, MI
ISE Project # 02633061

Sample ID: MW-301 36'-37'
Station: unknown
Ground Elev. (ft) unknown
Horizon: ASTM D422
Soil Description: Clay, some silt,
trace fine sand, brown,
moist.
Procedure: ASTM D422

Gravel, 3 in. to 4.75 mm: 0.00%
Sand, 4.75 to 0.075 mm: 1.75%
Coarse sand, 4.75 to 2.36 mm: 0.00%
Medium sand, 2.36 to 0.30 mm: 0.39%
Fine sand, 0.30 to 0.075 mm: 1.36%
Silt, 0.074 to 0.005 mm: 20.53%
Clay, smaller than 0.005 mm: 32.39%
Colloids, smaller than 0.001 mm: 45.33%

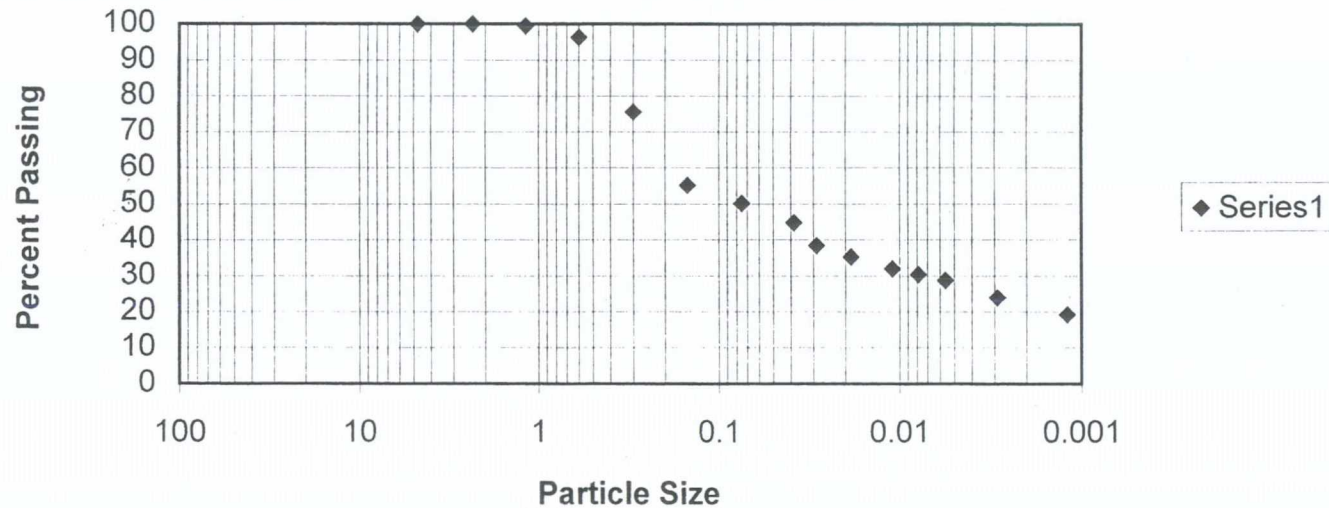


\\ise-srv\\clients\\02633061-williamsburg receiving and storage\\data\\hydrometer.xls

Williamsburg Recieving and Storage, LLC
10190 Munro Rd.
Williamsburg, MI
ISE Project # 02633061

Sample ID: MW-402 49'-50'
Station: unknown
Ground Elev. (ft): unknown
Horizon: ASTM D422
Soil Description: Some fine sand, some med. sand,
some silt, trace clay, brown,
silty, clayey, or gravelly sand, moist
Procedure: ASTM D422

Gravel, 3 in. to 4.75 mm:	0.00%
Sand, 4.75 to 0.075 mm:	49.85%
Coarse sand, 4.75 to 2.36 mm:	0.00%
Medium sand, 2.36 to 0.30 mm:	24.43%
Fine sand, 0.30 to 0.075 mm:	25.42%
Silt, 0.074 to 0.005 mm:	21.35%
Clay, smaller than 0.005 mm:	9.60%
Colloids, smaller than 0.001 mm:	19.20%



APPENDIX C

HYDROGEOLOGIC CROSS SECTIONS

Table 1
Groundwater Elevation Summary
Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI
ISE Project No. 02633061

Location	MW-101	MW-102	MW-201	MW-202	MW-301	MW-302	MW-401	MW-402	MW-501	MW-502	MW-601	MW-602	PZ-1	PZ-2	PZ-3	HAW-4	Bkg-S	Bkg-D
TOC Elevation	642.58	638.45	636.66	638.65	655.30	656.02	658.92	657.57	675.07	661.91	678.24	681.19	633.08	631.69	642.29	629.46	684.68	684.30
5/21/03	628.67	630.94	611.46	623.92	NM	634.29	624.52	624.09	NM	NM	NM	NM	NM	NM	NM	NM	624.94	624.99
5/23/03	628.67	631.00	611.46	623.88	628.86	634.32	624.55	624.10	NM	NM	NM	NM	NM	NM	NM	NM	624.92	624.97
5/28/03	628.65	630.88	611.49	623.86	628.84	634.42	624.61	626.17	NM	NM	NM	NM	NM	NM	NM	NM	624.98	NM
6/6/03	628.41	630.64	611.19	623.68	628.64	634.30	624.47	625.95	NM	NM	NM	NM	NM	NM	NM	NM	624.87	624.91
10/20/03	627.67	630.75	610.73	623.01	627.84	633.95	623.72	625.22	628.17	627.61	624.57	624.62	623.46	610.95	631.38	NM	624.10	624.16
10/30/03	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	623.46	NM	630.75	610.50	NM	NM

Notes: TOC = Top of Casing
NM = Not Measured
PZ = Piezometer
Bkg-S = Background Shallow
Bkg-D = Background Deep

Exemption 9

APPENDIX D

TABLES

Exemption 9

Table 2
Chloride Analytical Data
Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI
ISE Project No. 02633061

	Date Sampled	Date Completed	Chloride Concentration
MW-101	5/28/03	6/3/03	367
	6/6/03	6/10/03	250
MW-102	5/28/03	6/3/03	9
	6/6/03	6/10/03	10
MW-201	5/28/03	6/3/03	526
	6/6/03	6/10/03	496
MW-202	5/28/03	6/3/03	2
	6/6/03	6/10/03	1
MW-301	5/28/03	6/3/03	141
	6/6/03	6/10/03	137
MW-302	5/28/03	6/3/03	14
	6/6/03	6/10/03	17
MW-401	5/28/03	6/3/03	267
	6/6/03	6/10/03	376
MW-402	5/28/03	6/3/03	53
	6/6/03	6/10/03	60
MW-501	10/20/03	10/21/03	51
	10/30/03	11/4/03	43
MW-502	10/20/03	10/21/03	14
	10/30/03	11/4/03	7
MW-601	10/20/03	10/21/03	13
	10/30/03	11/4/03	8
MW-602	10/20/03	10/21/03	13
	10/30/03	11/4/03	5
HAW-4	10/30/03	11/4/03	170
	11/12/03		
BKG-S	5/28/03	6/3/03	5
	6/6/03	6/10/03	6
BKG-D	5/28/03	6/3/03	18

Notes: Concentrations in mg/L (PPM)
BKG-S = Background Shallow
BKG-D = Background Deep
HAW = Hand Auger Well
HAW-4 installed 10-30-03
Analytical Method = EPA 325.2

APPENDIX E

SOIL BORING LOGS
AND
MONITORING WELL / PIEZOMETER
CONSTRUCTION RECORDS



Traverse City 231-933-4041
Flushing 810-487-0555

BORING:

SB-201

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	DEPTH
	GRADE Grass					
	Sand, fine to medium, brown, moist					
	Sand, fine to medium, some silt, brown, moist					
	Sand, fine, trace clay, silt, dark gray, moist					
5	Clay, dark gray, moist					5
10	Clay, dark gray, moist					10
	Clay, tan, moist					
	Clay, dark gray, moist					
15						15
20						20
	Clay, brown, moist					
	EOB = 22'				Refusal	
25						25
30						30
35						35

Drilling Contractor: Manitou Technical Services	Driller: Scott Zenner	Drilling Method: Geoprobe	Date Drilled: 5/5/03
Logged By: JTH	Logging Method: ASTM 2488-90	Project #: 02633061-23	Sheet Number: 1 OF 1



Traverse City 231-933-4041
Flushing 810-487-0555

BORING:

SB-202

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	DEPTH
15						15
20	Sand, medium to coarse, brown to gray, very dense, wet	100	SBS		12,32,60	20
25	Sand, coarse, trace gravel, brown to gray, very loose, wet	5	SBS		1	25
30	Sand, fine, brown, very dense, wet	25	SBS		11,23,44	30
35	Clay, gray, very dense, wet					
35	Clay, gray, very dense, wet	50	SBS		13,30,33	35
	EOB = 35 ft					
40						40
45						45
50						50
Drilling Contractor: Shepler Drilling		Driller: Randy Shepler		Drilling Method: 4 1/2" HSA		Date Drilled: 5/20/03
Logged By: JTH		Logging Method: ASTM 2488		Project #: 02633061-25		Sheet Number: 1 OF 1



Traverse City 231-933-4041
Flushing 810-487-0555

BORING:**SB-302**

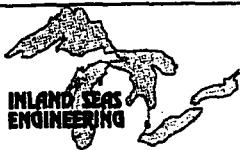
Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	DEPTH
	GRADE Grass					
	Topsoil, dry - 6"					
5						5
	Sand, fine to medium, brown, moist					
10	Clay, brown, moist					10
	Sand, fine to medium, brown, moist					
	Clay, some silt, some fine sand, trace gravel, brown to orange, moist					
15	Clay, brown to gray, moist					15
	Clay, silty, trace fine to medium sand, brown, moist					
	EOB = 16 ft					
20						20
25						25
30						30
35						35

Drilling Contractor: Manitou Technical Services	Driller: Scott Zenner	Drilling Method: Geoprobe	Date Drilled: 4/30/03
Logged By: DAK	Logging Method: ASTM 2488-90	Project #: 02633061-23	Sheet Number: 1 OF 1



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-101

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
	GRADE Sand Fill						
	Sand, fine, brown, moist						
5	Sand, fine to medium, trace silt, brown to gray, moist						5
	Sand, medium to coarse, trace silt, brown to gray, moist						
	Sand, medium to coarse, some silt, brown, moist						
10	Clay, trace sand, brown, moist						10
	Sand, fine, trace clay, brown, moist						
	Sand, medium to coarse, brown, wet						
15	Sand, fine, dark gray, wet						15
	Sand, fine to medium, brown, wet						
20	Sand, medium, brown to gray, wet						20
	Sand, fine to medium, some silt, brown, wet						
25							25
30	Sand, medium to coarse, brown, wet						30
	EOB = 32 ft						
35							35
Drilling Contractor: Manitou Technical Services		Driller: Scott Zenner		Drilling Method: Geoprobe		Date Drilled: 5/6/03	
Logged By: JTH		Logging Method: ASTM 2488-90		Development Method: Peristaltic Pump		Project #: 02633061-23	
Casing Type: 2" Schedule 40 PVC		Screen Type and Length: 2" PVC - 5'		Ground Elevation: 638.7		Top of Casing Elevation: 642.58	
						Sheet Number: 1 OF 1	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-102

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
	GRADE Gravel						
5	Sand, fine, trace gravel, trace coarse sand, brown, moist						5
	Sand, fine, some silt, brown, moist						
	Clay, silty, brown, moist						
	Clay, silty, brown to gray, moist						
	Clay, silty, gray to dark gray, moist						
10	Sand, fine, some silt, brown, wet						10
15							15
20	Sand, fine, some silt, gray to black, wet						20
25	Sand, fine to medium, trace coarse, tan to brown, wet						25
30							30
35	Sand, fine, some silt, brown, wet EOB = 32 ft						35

Drilling Contractor: Manitou Technical Services	Driller: Scott Zenner	Drilling Method: Geoprobe	Date Drilled: 5/5/03
Logged By: JTH	Logging Method: ASTM 2488-90	Development Method: Peristaltic Pump	Project #: 02633061-23
Casing Type: 2" Schedule 40 PVC	Screen Type and Length: 2" PVC - 5'	Ground Elevation: 635.2	Top of Casing Elevation: 638.45
		Sheet Number: 1 OF 1	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-201

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
	GRADE Grass						
5							5
10							10
15							15
20	Clay, gray, dense, moist	50	SBS		8,14,19,25		20
	Clay, brown, very dense, moist	50	SBS		7,21,42,23		
	Clay, some sand, brown, very dense, wet						
25	Sand, fine, trace clay, very dense, wet	50	SBS		10,30,49,53		25
30	Sand, medium to coarse, trace gravel, gray, very dense, wet	100	SBS		10,25,62		30
	Sand, medium, trace gravel, brown, very dense, wet						
35	Sand, medium, brown, very dense, wet	50	SBS		10,40,56		35
Drilling Contractor: Shepler Drilling		Driller: Randy Shepler		Drilling Method: 4 1/2" HSA		Date Drilled: 5/19/03	
Logged By: JTH		Logging Method: ASTM 2488		Development Method: Bailer		Project #: 02633061-25	
Casing Type: 2" Schedule 40 PVC		Screen Type and Length: 2" PVC 5 ft		Ground Elevation: 634.0		Top of Casing Elevation: 636.66	
						Sheet Number: 1 OF 2	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-201

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
40	Sand, medium, tan to brown, very dense, wet	75	SBS		10,29,52		40
45							45
50	Sand, fine to medium, gray, very dense, wet	100	SBS		9,28,49		50
55							55
60	Sand, medium to coarse, gray, dense, wet EOB = 60 ft	25	SBS		9,24		60
65							65
70							70
75							75
Drilling Contractor: Shepler Drilling		Driller: Randy Shepler		Drilling Method: 4 1/4" HSA		Date Drilled: 5/19/03	
Logged By: JTH		Logging Method: ASTM 2488		Development Method: Ballor		Project #: 02633061-25	
Casing Type: 2" Schedule 40 PVC		Screen Type and Length: 2" PVC 5 ft		Ground Elevation: 634.0		Top of Casing Elevation: 636.66	
						Sheet Number: 2 OF 2	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-202

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
	GRADE Sand Fill						
5	Sand, fine to medium, trace silt, trace clay, brown, moist						5
	Sand, fine, some clay, trace silt, brown, moist						
	Sand, fine, trace silt, brown, moist						
10	Sand, medium, brown to gray, moist						10
	Sand, medium to coarse, gray, moist						
	Sand, fine to medium, gray, moist						
15	Sand, fine to medium, brown, moist						15
20	Sand, medium to coarse, brown, wet						20
	EOB = 20 ft						
25							25
30							30
35							35
Drilling Contractor: Manitou Technical Services		Driller: Scott Zenner		Drilling Method: Geoprobe		Date Drilled: 5/6/03	
Logged By: JTH		Logging Method: ASTM 2488-90		Development Method: Peristaltic Pump		Project #: 02633061-23	
Casing Type: 2" Schedule 40 PVC		Screen Type and Length: 2" PVC - 5'		Ground Elevation: 635.0		Top of Casing Elevation: 638.65	
						Sheet Number: 1 OF 1	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-301

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
	GRADE Grass						
5	Sand, fine to medium, trace gravel, dark brown, moist.						5
	Sand, fine to medium, some silt, light brown, moist						
	Sand, fine to medium, some silt, gray/black, moist						
10	Sand, fine, trace coarse sand, some silt, dark brown, moist						10
	Sand, fine, trace coarse sand, some silt, light brown, moist						
15	Sand, fine to medium, light brown, moist						15
	Sand, fine to medium, little coarse sand, light brown, moist						
20	Sand, fine to medium, little coarse sand, little silt, light brown, moist						20
	Sand, fine to medium, little coarse sand, trace gravel, light brown, moist						
	Sand, fine to medium, little coarse sand, little gravel, light brown, moist						
25	Sand, medium to coarse, little gravel, brown, moist						25
	Sand, medium to coarse, trace gravel, light brown, wet						
30							30
Drilling Contractor: Manitou Technical Services		Driller: Scott Zenner		Drilling Method: Geoprobe		Date Drilled: 4/30/03	
Logged By: JTH		Logging Method: ASTM 2488-90		Development Method: Peristaltic Pump		Project #: 02633061-23	
Casing Type: 2" Schedule 40 PVC		Screen Type and Length: 2" PVC - 5'		Ground Elevation: 652.3		Top of Casing Elevation: 655.30	
						Sheet Number: 1 OF 2	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-301

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
30	Sand, fine, trace medium, trace coarse sand, trace gravel, fine to coarse gray, moist						30
35							35
	Clay, silty, and silt, gray, wet						
	EOB = 37 ft						
40							40
45							45
50							50
55							55
60							60
65							65
Drilling Contractor: Manitou Technical Services		Driller: Scott Zenner		Drilling Method: Geoprobe		Date Drilled: 4/30/03	
Logged By: JTH		Logging Method: ASTM2488-90		Development Method: Peristaltic Pump		Project #: 02633061-23	
Casing Type: 2" Schedule 40 PVC		Screen Type and Length: 2" PVC - 5'		Ground Elevation: 652.3		Top of Casing Elevation: 655.30	
						Sheet Number: 2 OF 2	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-302

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
GRADE	Fill Sand						
5							5
10							10
15							15
16	Clay, trace gravel, brown, very dense, moist						
17	Sand, fine, trace silt, trace gravel, very dense, moist	100	SBS		16,30,36,42		
20	Clay, some sand, brown, very dense, wet	50	SBS		16,26,67		20
21	Sand, some clay, brown, very dense, wet						
22	Clay, trace gravel, brown, very dense, wet	75	SBS		10,24,29,33		
23	Sand, trace clay, brown, very dense, wet						
24	Clay, trace sand, brown, very dense, wet	50	SBS		10,22,33		
25	EOB 24'						25
30							30
35							35
Drilling Contractor: Shepler Drilling		Driller: Randy Shepler		Drilling Method: 4 1/2" HSA		Date Drilled: 5/19/03	
Logged By: JTH		Logging Method: ASTM 2488		Development Method: Ballor		Project #: 02633061-25	
Casing Type: 2" Schedule 40 PVC		Screen Type and Length: 2" PVC - 5'		Ground Elevation: 653.4		Top of Casing Elevation: 656.02	
						Sheet Number: 1 OF 1	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-401

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
	GRADE Grass						
	Sand, medium to coarse, trace silts, some gravel, brown, moist						
	Clay, some sand, trace gravel, reddish brown, moist						
	Clay, some sand, trace gravel, trace silt, reddish brown, moist						
5	Clay, trace sand, trace gravel, brown, medium dense, moist	90	SBS		5,10,13,13		5
	Sand, coarse, some gravel, brown, very dense, moist	75	SBS		5,21,24		
	Sand, medium, trace gravel, very dense, brown, moist	50	SBS		10,23,37		
10	Sand, fine to medium, brown, dense, moist	50	SBS		5,16,23,27		10
	Sand, fine, brown, dense, moist	50	SBS		6,12,18,21		
15	Sand, fine to medium, brown, dense, moist	50	SBS		8,20,34		15
	Sand, fine to medium, brown, very dense, moist	50	SBS		8,23,41		
	Sand, fine to medium, tan, very dense, moist	50	SBS		18,30,51		
20	Sand, medium to coarse, trace gravel, brown, very dens	50	SBS		18,31,44		20
	Sand, medium to coarse, brown, very dense, moist	50	SBS		18,34,34		
25	Sand, fine to medium, gray, very dense, moist						
30		30	SBS		15,34,35		30
	Sand, fine to medium, brown, very dense, moist						
35	Sand, medium, brown, very dense, wet	30	SBS		11,29,41		35
Drilling Contractor: Shepler Drilling		Driller: Randy Shepler		Drilling Method: 4 1/4" HSA		Date Drilled: 5/19/03	
Logged By: JTH		Logging Method: ASTM 2488		Development Method: Baller		Project #: 02633061-25	
Casing Type: 2" Schedule 40 PVC		Screen Type and Length: 2" PVC 5 ft		Ground Elevation: 656.7 Top of Casing Elevation: 658.92		Sheet Number: 1 OF 2	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

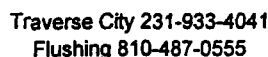
MW-401

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
40		75	SBS		11,53,38		40
45		30	SBS		18,24,24		45
50							50
55	Sand, medium, brown, very dense, wet	30	SBS		7,10,24		55
60							60
65		0	SBS		21,48		65
70	Sand, medium, brown, very dense, wet EOB = 70 ft	0	SBS		18,64		70
75							75
Drilling Contractor: Shepler Drilling		Driller: Randy Shepler		Drilling Method: 4 1/4" HSA		Date Drilled: 5/19/03	
Logged By: JTH		Logging Method: ASTM 2488		Development Method: Ballor		Project #: 02633061-25	
Casing Type: 2" Schedule 40 PVC		Screen Type and Length: 2" PVC 5 ft		Ground Elevation: Top of Casing Elevation: 656.7 658.92		Sheet Number: 2 OF 2	

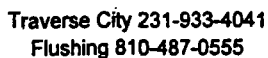


MW-402

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
	GRADE Gravel						
	Sand, coarse, gravel, brown, moist						
	Sand, medium, trace gravel, brown to gray, moist						
5	Sand, fine, dark gray, medium dense, moist	50	SBS		5,7,6,4		5
	Sand, fine, trace clay, brown, medium dense, moist	75	SBS		2,4,5,6		
	Clay, some sand, gray, loose, moist						
10	Sand, medium, trace gravel, brown, medium dense, moist	90	SBS		3,4,5,5		10
	Clay, gray, medium dense, moist						
		50	SBS		4,6,8,9		
	Sand, medium, trace gravel, brown, medium dense, moist						
		50	SBS		4,7,9,9		
15		50	SBS		2,3,4,5		15
	Sand, fine to medium, brown, loose, moist	50	SBS		3,3,2,2		
		75	SBS		3,5,7,7		
20							20
	Sand, fine to medium, brown, medium dense, moist	75	SBS		4,8,11,13		
25	Sand, medium to coarse, brown, medium dense, moist	75	SBS		6,10,14,14		25
	Sand, fine to medium, brown, medium dense, moist						
30		50	SBS		14,24,31		30
		50	SBS		14,21,33		
35	Sand, medium, brown, very dense, wet						
	Sand, medium, trace clay, gray, very dense, wet	50	SBS		6,15,41		35
Drilling Contractor: Shepler Drilling		Driller: Randy Shepler		Drilling Method: 4 1/4" HSA		Date Drilled: 5/19/03	
Logged By: JTH		Logging Method: ASTM 2488		Development Method: Ballor		Project #: 02633061-25	
Casing Type: 2" Schedule 40 PVC		Screen Type and Length: 2" PVC 5 ft		Ground Elevation: 655.4		Top of Casing Elevation: 657.57	
						Sheet Number: 1 OF 2	

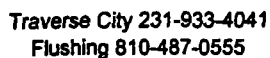
**MTV-402**

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
40	Sand, medium, dark gray, medium dense, wet	50	SBS		5,18,26		40
45		50	SBS		4,14,21		45
50	Sand, medium to coarse, brown to gray, medium dense, wet Clay, gray, medium dense, wet EOB = 50 ft	75	SBS		5,16,26		50
55							55
60							60
65							65
70							70
75							75
Drilling Contractor: Shepler Drilling		Driller: Randy Shepler		Drilling Method: 4 1/4" HSA		Date Drilled: 5/19/03	
Logged By: JTH		Logging Method: ASTM 2488		Development Method: Bailer		Project #: 02633061-25	
Casing Type: 2" PVC		Screen Type and Length: 2" PVC 5 ft		Ground Elevation: 655.4		Top of Casing Elevation: 657.57	
						Sheet Number: 2 OF 2	

**MVW-501**

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
	GRADE GRASS						
	Topsoil sand & silt, brown, moist wood fragments @ 1' - 1 1/2'	75			3-7-7-9		
	Sand, fine, dark brown, moist	60			5-6-8-8		
5		30			2-8-24-7		5
		50			9-9-5-7		
10		85			4-4-8-9		10
		75			6-9-11-12		
	Clay, brown, moist	70			3-3-6-7		
15	Clay, brown, moist to 6", sand, fine & silt, brown, moist	70			4-10-22-20		15
	Sand, fine & silt, brown, moist	90			4-8-11-20		
20		80			5-11-19-25		20
25	Sand, fine, brown, moist	90			4-4-5-10		25
30		75			7-20-36-43		30
35	Sand, fine, brown, moist, silty @ bottom	95			6-12-18-22		35
Drilling Contractor: E & G Drilling		Driller: Bob Gerbers		Drilling Method: 4 1/4" HSA		Date Drilled: 10/15/03	
Logged By: JDH		Logging Method: ASTM D 2488		Development Method: Baller		Project #: 2633061	
Casing Type: PVC		Screen Type and Length: PVC 5 ft		Ground Elevation: 671.87		Top of Casing Elevation: 675.07	
						Sheet Number: 1 of 2	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL: **MW-501**

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
35							35
40	Sand, fine, brown, moist becoming silty @ 40'	90			10-17-36-44		40
45							45
50	Sand, fine, brown, wet 49-51'	90			5-25-100		50
65	Silt, brown to gray, wet 59-61'	100			15-19-24-76		65
	No recovery 69-71'	0			45-82-100		
80	Silt, brown to gray, wet 79-81'	100			62-39-100		80
	Silt to silty clay, gray @ 87' 86-88'	100			52-100		
	89-91'				75-28-54-100		
95	EOB 91'						95
Drilling Contractor: E & G Drilling		Driller: Bob Gerbers		Drilling Method: 4 1/2" HSA		Date Drilled: 10/15/03	
Logged By: JDH		Logging Method: ASTM D 2488		Development Method: Bailer		Project #: 2633061	
Casing Type: PVC		Screen Type and Length: PVC 5 ft		Ground Elevation: 671.87		Top of Casing Elevation: 675.07	
						Sheet Number: 2 of 2	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-502 Page 1 of 3

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
	GRADE GRASS						
	Silty sand, dark brown	80			6-7-7-7		
	Silty sand, very dark brown						
	Fine sand, some silt, dark brown moist	65			11-10-8-8		
5	Fine sand, dark brown, moist	80			9-10-6-9		5
		90			7-6-8-16		
		80			4-7-7-6		
10		60			2-4-8-8		10
	Top 6" fine sand, dark brown, moist	70			3-6-7-10		
	bottom 18" fine sand, light brown						
15	Fine sand, light brown, moist	80			4-5-7-11		15
		75			5-9-14-16		
		90			8-8-15-20		
20							20
		95			11-16-26-34		
25							25
		90			5-19-30-34		
30	Fine sand, brown						30
35	Fine sand, trace silt, brown, saturated wet	45			13-22-17-24		35
Drilling Contractor: E & G Drilling		Driller: Bob Gerbers		Drilling Method: 4 1/4" HSA		Date Drilled: 10/16/03	
Logged By: JDH		Logging Method: ASTM D 2488		Development Method: Baller		Project #: 02633061	
Casing Type: PVC		Screen Type and Length: PVC 5 ft		Ground Elevation: 658.78		Top of Casing Elevation: 661.91	
						Sheet Number: 1 of 3	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-502 Page 2 of 3

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
35							35
40	Fine Sand, Few Silt, Wet/Saturated, Brown	80			5-12-22-34		40
45							45
50	Fine Sand, Light Brown, Sat	95			15-6-19-46 See Note		50
55							55
60	Fine Sand, Light Brown, Sat Fine Sand, Silt, Light Brown (Bottom 4")	90			23-29-85-47		60
65							65
70		0			24-12-42-100		70
Drilling Contractor: E & G Drilling		Driller: Bob Gerbers		Drilling Method: 4 1/4" HSA		Date Drilled: 10/16/03	
Logged By: JDH		Logging Method: ASTM D 2488		Development Method: Ballor		Project #: 2633061	
Casing Type: PVC		Screen Type and Length: PVC 5 ft		Ground Elevation: 658.78		Top of Casing Elevation: 661.91	
						Sheet Number: 2 of 3	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-502 Page 3 of 3

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
70							70
75	Clay: Likely clay lens, not sampled						75
80	Sand: Fine, Light Brown, Trace Silt	95			26-22-28-50		80
85	Sand: Top is Fine						85
90	Clay: Grey, Wet (Bottom 1')	50			25,23,50		90
	Clay: Grey, Wet	100			25,27,50		
	Sand: Fine, Light Brown, Saturated (6")						
95	Sand: Fine, Light Brown, Saturated (1")	90			21,26,50		95
	Clay: Gray, Wet						
100	EOB @ 95'						100
							0
Drilling Contractor: E & G Drilling		Driller: Bob Gerbers		Drilling Method: 4 1/4" HSA		Date Drilled: 10/16/03	
Logged By: JDH		Logging Method: ASTM D 2488		Development Method: Bailer		Project #: 2633061	
Casing Type: PVC		Screen Type and Length: PVC 5 ft		Ground Elevation: 658.78		Top of Casing Elevation: 661.91	
						Sheet Number: 3 of 3	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL: MW-601 Page 1 of 3

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:
Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL		BLOW COUNT	WELL DIAGRAM	DEPTH
0	GRADE Grass							0
5								5
10								10
15								15
20		95	SBS			8-15-30-41		20
25	Sand, fine, light brown, moist Sand, silty, dark brown, moist	90	SBS			8-16-25-51		25
30		95	SBS			16-24-43-50		30
35	Sand, fine, light brown, moist							35

Drilling Contractor:	Driller:	Drilling Method:	Date Drilled:
E & G Drilling	Bob Gerbers	4 1/4" HSA	10/17/03
Logged By:	Logging Method:	Development Method:	Project #:
JDH	ASTM D 2488	Ballor	02633061
Casing Type:	Screen Type and Length:	Ground Elevation:	Top of Casing Elevation:
PVC	PVC 5 ft	675.01	678.24
			Sheet Number:
			1 of 3



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-601 Page 2 of 3

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
40		40	SBS		17-50		40
	Sand, fine, light brown, moist						
45	Sand, fine, few gravel, light brown, moist						45
50	Sand, fine, trace gravel, light brown, moist	60	SBS		5-21-37-50		50
▽	Sand, fine, trace silt, brown, wet						▽
55							55
60	Sand, fine to medium, trace coarse sand, light brown, wet	100	SBS		19-12-21-50		60
	Sand, fine to medium, trace silt, wet						
65							65
70							70
75							75
Drilling Contractor: E & G Drilling		Driller: Bob Gerbers		Drilling Method: 4 1/4" HSA		Date Drilled: 10/17/03	
Logged By: JDH		Logging Method: ASTM D 2488		Development Method: Bailer		Project #: 02633061	
Casing Type: PVC		Screen Type and Length: PVC 5 ft		Ground Elevation: 675.01 Top of Casing Elevation: 678.24		Sheet Number: 2 of 3	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-601 Page 3 of 3

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
	Fine sand, trace medium, light brown, wet, coarsening upward	100	SBS		18-32-43-50		
80		80	SBS		3-4-7-22		80
85							85
90	Sand, fine, trace medium, light brown, saturated	80	SBS		24-38-54-50		90
95							95
100	Sand, fine, trace silt, light brown, saturated	60	SBS		24-30-25-50		100
105	EOB @ 101'						105
110							110
115							115
Drilling Contractor: E & G Drilling		Driller: Bob Gerbers		Drilling Method: 4 1/2" HSA		Date Drilled: 10/17/03	
Logged By: JDH		Logging Method: ASTM D 2488		Development Method: Ballor		Project #: 02633061	
Casing Type: PVC		Screen Type and Length: PVC 5 ft		Ground Elevation: 675.01		Top of Casing Elevation: 678.24	
						Sheet Number: 3 of 3	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-602 Page 1 of 3

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
0	GRADE Grass						0
5							5
10							10
15							15
20	Sand, fine, light brown Silt, dark brown Sand, fine, light brown	95	SBS		17-15-41-50		20
25		60	SBS		15-26-50		25
30		60	SBS		15-30-50		30
35	Sand, fine, light brown, moist	55	SBS		14-48-50		35
Drilling Contractor: E & G Drilling		Driller: Bob Gerbers		Drilling Method: 4 1/4" HSA		Date Drilled: 10/17/03	
Logged By: JDH		Logging Method: ASTM D 2488		Development Method: Baller		Project #: 02633061	
Casing Type: PVC		Screen Type and Length: PVC 5 ft		Ground Elevation: 677.89		Top of Casing Elevation: 681.19	
						Sheet Number: 1 of 3	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-602 Page 2 of 3

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
40		60	SBS		17-50		40
45							45
50	Sand, fine, light brown, moist Sand, fine, brown, moist Sand, fine, trace silt, light brown, moist	55	SBS		5-21-37-50		50
55							55
60	Sand, fine, trace medium, light brown, Sand, silty, wet	100	SBS		19-12-21-50		60
65							65
70		100	SBS				70
75	Sand, fine, trace medium, light brown, wet, heave						75
Drilling Contractor: E & G Drilling		Driller: Bob Gerbers		Drilling Method: 4 1/4" HSA		Date Drilled: 10/17/03	
Logged By: JDH		Logging Method: ASTM D 2488		Development Method: Ballot		Project #: 02633061	
Casing Type: PVC		Screen Type and Length: PVC 5 ft		Ground Elevation: 677.89		Top of Casing Elevation: 681.19	
						Sheet Number: 2 of 3	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

MW-602 Page 3 of 3

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
80		100	SBS		18-44-27-33		80
85							85
90	Sand, fine, trace medium, light brown, wet, heave						
90	Sand, fine to medium, light brown, wet	70	SBS		16-8-10-12		90
95							95
100	Sand, fine, light brown, wet, EOB@99'	95	SBS		28-49-37-50		100
105							105
110							110
115							115
Drilling Contractor: E & G Drilling		Driller: Bob Gerbers		Drilling Method: 4 1/4" HSA		Date Drilled: 10/17/03	
Logged By: JDH		Logging Method: ASTM D 2488		Development Method: Ballor		Project #: 02633061	
Casing Type: PVC		Screen Type and Length: PVC 5 ft		Ground Elevation: 677.89		Top of Casing Elevation: 681.19	
						Sheet Number: 3 of 3	



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

Background Monitor Well

**Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690**

PREPARED FOR:

**Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690**

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
	GRADE Grass						
5	Sand, medium to coarse, trace gravel, brown, medium dense, moist	50	SBS		3,5,5,7		5
	Sand, medium to coarse, reddish brown, loose, moist	50	SBS		4,7,5,5		
	Sand, medium, trace clay, reddish brown, loose, moist						
10	Sand, medium to coarse, trace silt, trace clay, reddish brown, loose, moist	75	SBS		1,2,3,6		10
	Sand, fine to medium, brown, medium dense, moist	50	SBS		6,12,16,20		
	Sand, medium, brown, dense, moist	75	SBS		9,20,26,27		
15	Sand, medium, tan, medium dense, moist	75	SBS		10,18,21		15
		75	SBS		11,24,37,41		
		50	SBS		15,33,43		
20		50	SBS		17,35,46		20
25	Sand, medium, tan, very dense, moist	50	SBS		16,38,43		25
30		50	SBS		20,66		30
35	Sand, medium to coarse, tan, very dense, moist	30	SBS		25,50		35

Drilling Contractor: Shepler Drilling	Driller: Randy Shepler	Drilling Method: 4 1/4" HSA	Date Drilled: 5/20/03
Logged By: JTH	Logging Method: ASTM 2488	Development Method: Ballor	Project #: 02633061-25
Casing Type: 2" Schedule 40 PVC	Screen Type and Length: 2" PVC 5 ft	Ground Elevation: 682.4	Top of Casing Elevation: S - 684.68 / D - 684.3
			Sheet Number: 1 OF 2



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

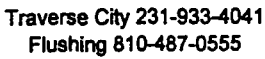
Background Monitor Well

**Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690**

PREPARED FOR:

**Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690**

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
40	Sand, coarse, some gravel, very dense, moist	30	SBS		17,71		40
45	Sand, medium to coarse, very dense, moist	30	SBS		33,56		45
50							50
55	Sand, coarse, trace gravel, very dense, moist	20	SBS		60,30		55
60							60
65	Sand, coarse, some gravel, very dense, wet	20	SBS		17,41		65
70							70
75	Trace Gravel EOB = 75 ft	0	SBS				75
Drilling Contractor: Shepler Drilling		Driller: Randy Shepler		Drilling Method: 4 1/4" HSA		Date Drilled: 5/20/03	
Logged By: JTH		Logging Method: ASTM 2488		Development Method: Bailer		Project #: 02633061-25	
Casing Type: 2" PVC		Screen Type and Length: 2" PVC 5 ft		Ground Elevation: 682.4		Top of Casing Elevation: S - 684.68 / D - 684.3	
				Sheet Number: 2 OF 2			



PZ-1

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

[illegible]



Traverse City 231-933-4041
Flushing 810-487-0555

WELL:

PZ-2

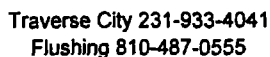
Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

DEPTH	SOIL DESCRIPTION AND COMMENTS	PERCENT RECOVERY	SAMPLE METHOD	TYPE & INTERVAL	BLOW COUNT	WELL DIAGRAM	DEPTH
	GRADE Sand						
	CLAY, trace sand, trace gravel, brown, moist						
	CLAY, gray, moist						
5	CLAY, trace fine sand, brown, moist						5
	SAND, fine, brown, moist						
10	SAND, fine, some silt, brown, moist						10
15							15
	▽ SAND, fine, brown, moist						
							0
							0
							0
							0

Drilling Contractor: Inland Seas Engineering, Inc	Driller: Jeff Hill	Drilling Method: Hand Auger	Date Drilled: 6/23/03
Logged By: JTH	Logging Method: ASTM D 2488	Development Method: N/A	Project #: 02633061-25E
Casing Type: PVC	Screen Type and Length: PVC 5 Ft	Ground Elevation: 627.27	Top of Casing Elevation: 631.69
			Sheet Number: 1 OF 1



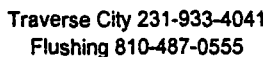
PZ-3

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

PREPARED FOR:

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

[illegible]



HAW-4

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

Williamsburg Receiving and Storage LLC
10190 Munro Road
Williamsburg, MI 49690

[illegible]

APPENDIX F

**LABORATORY ANALYTICAL
TESTING REPORTS**



4125 Cedar Run Rd., Suite B
Traverse City, MI 49684
Phone 231-946-6767
Fax 231-946-8741
www.sosanalytical.com

COMPANY: WILLIAMSBURG R & S

SOS PROJECT NO: 032003 - 1
SAMPLED BY: JEFF HILL/ISE

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

DATE RECEIVED: 5/30/03
TIME RECEIVED: 8:30 AM
SAMPLE ID: BKG-S

DATE SAMPLED: 5/28/03
TIME SAMPLED:
SAMPLE MATRIX: WATER

WILLIAMSBURG
MI

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	5	3	mg/L (PPM)	KMC	6/3/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

SHANNA SHEA
LAB MANAGER



4125 Cedar Run Rd., Suite B
Traverse City, MI 49684
Phone 231-946-6767
Fax 231-946-8741
www.sosanalytical.com

COMPANY: WILLIAMSBURG R & S

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG
MI

COUNTY:

TWP:

SOS PROJECT NO: 032003 - 2
SAMPLED BY: JEFF HILL/ISE

DATE RECEIVED: 5/30/03
TIME RECEIVED: 8:30 AM
SAMPLE ID: BKG-D

DATE SAMPLED: 5/28/03
TIME SAMPLED:
SAMPLE MATRIX: WATER

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	18	3	mg/L (PPM)	KMC	6/3/03	

ND = NOT DETECTED
LOD = LIMIT OF DETECTION
SMCL = FEDERAL NON-ENFORCEABLE LIMIT
MCL = MAXIMUM CONTAMINANT LEVEL
s.u. = STANDARD pH UNITS REPORTED AT 25 C
DISS = DISSOLVED

Page 1 of 1

APPROVED BY:

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LAB MANAGER



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Traverse City, MI 49684
Phone 231-946-6767
Fax 231-946-8741
www.sosanalytical.com

COMPANY: WILLIAMSBURG R & S

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG
MI

COUNTY:

TWP:

SOS PROJECT NO: 032003 - 3

SAMPLED BY: JEFF HILL/ISE

DATE RECEIVED: 5/30/03

TIME RECEIVED: 8:30 AM

SAMPLE ID: MW-101

DATE SAMPLED: 5/28/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	367	5	mg/L (PPM)	KMC	6/3/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

Shanna Shea

SHANNA SHEA
LAB MANAGER



4125 Cedar Run Rd., Suite B
Traverse City, MI 49684
Phone 231-946-6767
Fax 231-946-8741
www.sosanalytical.com

COMPANY: WILLIAMSBURG R & S

SOS PROJECT NO: 032003 - 4
SAMPLED BY: JEFF HILL/ISE

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG
MI

DATE RECEIVED: 5/30/03
TIME RECEIVED: 8:30 AM
SAMPLE ID: MW-102

DATE SAMPLED: 5/28/03
TIME SAMPLED:
SAMPLE MATRIX: WATER

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	9	2	mg/L (PPM)	KMC	6/3/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

Shanna Shea

SHANNA SHEA
LAB MANAGER



4125 Cedar Run Rd., Suite B
Traverse City, MI 49684
Phone 231-946-6767
Fax 231-946-8741
www.sosanalytical.com

COMPANY: WILLIAMSBURG R & S

SOS PROJECT NO: 032003 - 5
SAMPLED BY: JEFF HILL/ISE

NAME:

PROJECT NO: 02633061.28

DATE RECEIVED: 5/30/03

WSSN:

TIME RECEIVED: 8:30 AM

WELL PERMIT:

SAMPLE ID: MW-201

TAX ID:

DATE SAMPLED: 5/28/03

LOCATION: 10190 MUNRO RD

TIME SAMPLED:

WILLIAMSBURG
MI

SAMPLE MATRIX: WATER

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	526	5	mg/L (PPM)	KMC	6/3/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

SHANNA SHEA
LAB MANAGER



4125 Cedar Run Rd., Suite B
Traverse City, MI 49684
Phone 231-946-6767
Fax 231-946-8741
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COMPANY: WILLIAMSBURG R & S

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG

MI

COUNTY:

TWP:

SOS PROJECT NO: 032003 - 6

SAMPLED BY: JEFF HILL/ISE

DATE RECEIVED: 5/30/03

TIME RECEIVED: 8:30 AM

SAMPLE ID: MW-202

DATE SAMPLED: 5/28/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	2	2	mg/L (PPM)	KMC	6/3/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

Shanna Shea

SHANNA SHEA

LAB MANAGER

Page 1 of 1



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Traverse City, MI 49684
Phone 231-946-6767
Fax 231-946-8741
www.sosanalytical.com

COMPANY: WILLIAMSBURG R & S

SOS PROJECT NO: 032003 - 7
SAMPLED BY: JEFF HILL/ISE

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

DATE RECEIVED: 5/30/03
TIME RECEIVED: 8:30 AM
SAMPLE ID: MW-301

DATE SAMPLED: 5/28/03
TIME SAMPLED:
SAMPLE MATRIX: WATER

WILLIAMSBURG
MI

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	141	3	mg/L (PPM)	KMC	6/3/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

Shanna Shea

SHANNA SHEA
LAB MANAGER



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Traverse City, MI 49684
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Fax 231-946-8741
www.sosanalytical.com

COMPANY: WILLIAMSBURG R & S

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG

MI

COUNTY:

TWP:

SOS PROJECT NO: 032003 - 8

SAMPLED BY: JEFF HILL/ISE

DATE RECEIVED: 5/30/03

TIME RECEIVED: 8:30 AM

SAMPLE ID: MW-302

DATE SAMPLED: 5/28/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	14	2	mg/L (PPM)	KMC	6/3/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

Shanna Shea

SHANNA SHEA

LAB MANAGER



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Phone 231-946-6767
Fax 231-946-8741
www.sosanalytical.com

COMPANY: WILLIAMSBURG R & S

SOS PROJECT NO: 032003 - 9
SAMPLED BY: JEFF HILL/ISE

NAME:

PROJECT NO: 02633061.28

DATE RECEIVED: 5/30/03

WSSN:

TIME RECEIVED: 8:30 AM

WELL PERMIT:

SAMPLE ID: MW-401

TAX ID:

LOCATION: 10190 MUNRO RD

DATE SAMPLED: 5/28/03

WILLIAMSBURG

TIME SAMPLED:

MI

SAMPLE MATRIX: WATER

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	267	3	mg/L (PPM)	KMC	6/3/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

Shanna Shea

SHANNA SHEA
LAB MANAGER



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Traverse City, MI 49684
Phone 231-946-6767
Fax 231-946-8741
www.sosanalytical.com

COMPANY: WILLIAMSBURG R & S

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG

MI

COUNTY:

TWP:

SOS PROJECT NO: 032003 - 10

SAMPLED BY: JEFF HILL/ISE

DATE RECEIVED: 5/30/03

TIME RECEIVED: 8:30 AM

SAMPLE ID: MW-402

DATE SAMPLED: 5/28/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	53	2	mg/L (PPM)	KMC	6/3/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

Shanna Shea

SHANNA SHEA

LAB MANAGER



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Fax 231-946-8741
www.sosanalytical.com

COMPANY: WILLIAMSBURG R & S

SOS PROJECT NO: 032186 - 1
SAMPLED BY: JEFF HILL/ISE

NAME:

PROJECT NO: 02633061.28

DATE RECEIVED: 6/6/03

WSSN:

TIME RECEIVED: 2:08 PM

WELL PERMIT:

SAMPLE ID: BKG-S

TAX ID:

LOCATION: 10190 MUNRO RD

DATE SAMPLED: 6/6/03

WILLIAMSBURG
MI

TIME SAMPLED:

SAMPLE MATRIX: WATER

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	6	1	mg/L (PPM)	KMC	6/10/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

Shanna Shea
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COMPANY: WILLIAMSBURG R & S

SOS PROJECT NO: 032186 - 2
SAMPLED BY: JEFF HILL/ISE

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG
MI

DATE RECEIVED: 6/6/03
TIME RECEIVED: 2:08 PM
SAMPLE ID: MW-101

DATE SAMPLED: 6/6/03
TIME SAMPLED:
SAMPLE MATRIX: WATER

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	250	5	mg/L (PPM)	KMC	6/10/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

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COMPANY: WILLIAMSBURG R & S

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG
MI

COUNTY:

TWP:

SOS PROJECT NO: 032186 - 3

SAMPLED BY: JEFF HILL/ISE

DATE RECEIVED: 6/6/03

TIME RECEIVED: 2:08 PM

SAMPLE ID: MW-102

DATE SAMPLED: 6/6/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	10	1	mg/L (PPM)	KMC	6/10/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

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Page 1 of 1



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COMPANY: WILLIAMSBURG R & S

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG
MI

COUNTY:

TWP:

SOS PROJECT NO: 032186 -4

SAMPLED BY: JEFF HILL/ISE

DATE RECEIVED: 6/6/03

TIME RECEIVED: 2:08 PM

SAMPLE ID: MW-201

DATE SAMPLED: 6/6/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	496	6	mg/L (PPM)	KMC	6/10/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

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COMPANY: WILLIAMSBURG R & S

SOS PROJECT NO: 032186 - 5
SAMPLED BY: JEFF HILL/ISE

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG
MI

DATE RECEIVED: 6/6/03
TIME RECEIVED: 2:08 PM
SAMPLE ID: MW-202

DATE SAMPLED: 6/6/03
TIME SAMPLED:
SAMPLE MATRIX: WATER

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	1	1	mg/L (PPM)	KMC	6/10/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

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COMPANY: WILLIAMSBURG R & S

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG
MI

SOS PROJECT NO: 032186 - 6

SAMPLED BY: JEFF HILL/ISE

DATE RECEIVED: 6/6/03

TIME RECEIVED: 2:08 PM

SAMPLE ID: MW-301

DATE SAMPLED: 6/6/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	137	3	mg/L (PPM)	KMC	6/10/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

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COMPANY: WILLIAMSBURG R & S

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG
MI

COUNTY:

TWP:

SOS PROJECT NO: 032186 - 7

SAMPLED BY: JEFF HILL/ISE

DATE RECEIVED: 6/6/03

TIME RECEIVED: 2:08 PM

SAMPLE ID: MW-302

DATE SAMPLED: 6/6/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	17	1	mg/L (PPM)	KMC	6/10/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

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COMPANY: WILLIAMSBURG R & S

SOS PROJECT NO: 032186 -8
SAMPLED BY: JEFF HILL/ISE

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG
MI

DATE RECEIVED: 6/6/03
TIME RECEIVED: 2:08 PM
SAMPLE ID: MW-401

DATE SAMPLED: 6/6/03
TIME SAMPLED:
SAMPLE MATRIX: WATER

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	376	5	mg/L (PPM)	KMC	6/10/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

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COMPANY: WILLIAMSBURG R & S

SOS PROJECT NO: 032186 -9
SAMPLED BY: JEFF HILL/ISE

NAME:

PROJECT NO: 02633061.28

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG
MI

DATE RECEIVED: 6/6/03
TIME RECEIVED: 2:08 PM
SAMPLE ID: MW-402

DATE SAMPLED: 6/6/03
TIME SAMPLED:
SAMPLE MATRIX: WATER

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	60	2	mg/L (PPM)	KMC	6/10/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

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COMPANY: CHERRY BLOSSOM, L.L.C.

SOS PROJECT NO: 035436 - 2
SAMPLED BY: TIM GATES/ISE

NAME:
PROJECT NO: 02633061
WSSN:
WELL PERMIT:
TAX ID:
LOCATION:

DATE RECEIVED: 10/20/03
TIME RECEIVED: 3:34 PM
SAMPLE ID: MW-501

DATE SAMPLED: 10/20/03
TIME SAMPLED:
SAMPLE MATRIX: WATER

WILLIAMSBURG
MI

COUNTY:
TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	51	5	mg/L (PPM)	KMC	10/21/03	

ND = NOT DETECTED
LOD = LIMIT OF DETECTION
SMCL = FEDERAL NON-ENFORCEABLE LIMIT
MCL = MAXIMUM CONTAMINANT LEVEL
s.u. = STANDARD pH UNITS REPORTED AT 25 C
DISS = DISSOLVED

Page 1 of 1

APPROVED BY: _____

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COMPANY: CHERRY BLOSSOM, L.L.C.

SOS PROJECT NO: 035436 - 3
SAMPLED BY: TIM GATES/ISE

NAME:

PROJECT NO: 02633061

DATE RECEIVED: 10/20/03

WSSN:

TIME RECEIVED: 3:34 PM

WELL PERMIT:

SAMPLE ID: MW-502

TAX ID:

LOCATION:

DATE SAMPLED: 10/20/03

WILLIAMSBURG
MI

TIME SAMPLED:

SAMPLE MATRIX: WATER

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	14	5	mg/L (PPM)	KMC	10/21/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY: _____

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Page 1 of 1



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COMPANY: CHERRY BLOSSOM, L.L.C.

NAME:

PROJECT NO: 02633061

WSSN:

WELL PERMIT:

TAX ID:

LOCATION:

WILLIAMSBURG
MI

COUNTY:

TWP:

SOS PROJECT NO: 035436 - 1
SAMPLED BY: TIM GATES/ISE

DATE RECEIVED: 10/20/03

TIME RECEIVED: 3:34 PM

SAMPLE ID: MW-601

DATE SAMPLED: 10/20/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	13	5	mg/L (PPM)	KMC	10/21/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY: _____

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COMPANY: CHERRY BLOSSOM, L.L.C.

SOS PROJECT NO: 035436 - 4
SAMPLED BY: TIM GATES/ISE

NAME:

PROJECT NO: 02633061

WSSN:

WELL PERMIT:

TAX ID:

LOCATION:

DATE RECEIVED: 10/20/03

TIME RECEIVED: 3:34 PM

SAMPLE ID: MW-602

DATE SAMPLED: 10/20/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

WILLIAMSBURG
MI

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	13	5	mg/L (PPM)	KMC	10/21/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

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COMPANY: WILLIAMSBURG R & S

SOS PROJECT NO: 035699 - 1
SAMPLED BY: JEFF HILL/ISE

NAME:

PROJECT NO: 02633061-25E

DATE RECEIVED: 10/30/03

WSSN:

TIME RECEIVED: 3:20 PM

WELL PERMIT:

SAMPLE ID: MW-501

TAX ID:

LOCATION:

DATE SAMPLED: 10/30/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

WILLIAMSBURG
MI

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	43	3	mg/L (PPM)	KMC	11/4/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

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NAME:

PROJECT NO: 02633061-25E

WSSN:

WELL PERMIT:

TAX ID:

LOCATION:

WILLIAMSBURG
MI

COUNTY:

TWP:

SOS PROJECT NO: 035899 - 2
SAMPLED BY: JEFF HILL/ISE

DATE RECEIVED: 10/30/03

TIME RECEIVED: 3:20 PM

SAMPLE ID: MW-502

DATE SAMPLED: 10/30/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	7	3	mg/L (PPM)	KMC	11/4/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:


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Page 1 of 1



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NAME:

PROJECT NO: 02633061-25E

WSSN:

WELL PERMIT:

TAX ID:

LOCATION:

WILLIAMSBURG
MI

SOS PROJECT NO: 035699 - 3

SAMPLED BY: JEFF HILL/ISE

DATE RECEIVED: 10/30/03

TIME RECEIVED: 3:20 PM

SAMPLE ID: MW-601

DATE SAMPLED: 10/30/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	8	3	mg/L (PPM)	KMC	11/4/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

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COMPANY: WILLIAMSBURG R & S

NAME:

PROJECT NO: 02633061-2SE

WSSN:

WELL PERMIT:

TAX ID:

LOCATION:

WILLIAMSBURG
MI

COUNTY:

TWP:

SOS PROJECT NO: 035699 - 4

SAMPLED BY: JEFF HILL/ISE

DATE RECEIVED: 10/30/03

TIME RECEIVED: 3:20 PM

SAMPLE ID: MW-602

DATE SAMPLED: 10/30/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	5	3	mg/L (PPM)	KMC	11/4/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

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COMPANY: WILLIAMSBURG R & S

NAME:

PROJECT NO: 02633061-25E

WSSN:

WELL PERMIT:

TAX ID:

LOCATION:

WILLIAMSBURG
MI

COUNTY:

TWP:

SOS PROJECT NO: 035699 - 6
SAMPLED BY: JEFF HILL/TSE

DATE RECEIVED: 10/30/03

TIME RECEIVED: 3:20 PM

SAMPLE ID: HAW-4

DATE SAMPLED: 10/30/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	170	5	mg/L (PPM)	KMC	11/4/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

Shanna Shea

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LAB MANAGER



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COMPANY: WILLIAMSBURG R & S

SOS PROJECT NO: 035889 - 1
SAMPLED BY: TIM GATES/TSE

NAME:

PROJECT NO: 02633061

DATE RECEIVED: 11/12/03

WSSN:

TIME RECEIVED: 10:55 AM

WELL PERMIT:

SAMPLE ID: HAW-4

TAX ID:

LOCATION: MUNROE RD

DATE SAMPLED: 11/12/03

WILLIAMSBURG

TIME SAMPLED:

MI

SAMPLE MATRIX: WATER

COUNTY:

TWP:

INORGANICS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
CHLORIDE EPA 325.2	155	5	mg/L (PPM)	KMC	11/18/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

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Page 1 of 1

APPENDIX G

**SOUTHERN BRINING PIT AREA
STORMWATER OUTFALL
SAMPLING RESULTS**

RECEIVED AUG 25 2003

**Daily Flow Log
Southern Brine Pit Area
Pavement Drain Outfalls
Eastern Retention Basin**

Month May, 2003

Date	North Outfall	South Outfall	North Outfall	South Outfall	PRECIP ? (Y/N)	Initials	Time
	FLOW ? (Y/N)		SAMPLED ? (Y/N)				
1	N	N	N	N	N	[Signature]	4:00 am (pm)
2	N	N	N	N	N	[Signature]	3:45 am (pm)
3	N	N	N	N	N	[Signature]	10:45 am (pm)
4	N	N	N	N	N	[Signature]	7:45 am (pm)
5	Y	Y	Y	N	Y	[Signature]	12:00 am (pm)
6	N	N	N	N	Y misting	[Signature]	7:00 am (pm)
7	N	N	N	N	N	[Signature]	2:40 am (pm)
8	N	N	N	N	N	[Signature]	12:05 am (pm)
9	N	N	N	N	N	[Signature]	3:15 am (pm)
10	N	N	N	N	N	[Signature]	2:00 am (pm)
11	Y	Y	N	N	Y	[Signature]	6:00 am (pm)
12	Y	Y	N	N	Y - not enough flow sample	[Signature]	10:00 am (pm)
13	N	N	N	N	N	[Signature]	4:00 am (pm)
14	N	N	N	N	N	[Signature]	8:15 am (pm)
15	N	N	N	N	N	[Signature]	4:00 am (pm)
16	N	N	N	N	N	[Signature]	4:00 am (pm)
17	N	N	N	N	N	[Signature]	7:00 am (pm)
18	N	N	N	N	N	[Signature]	7:00 am (pm)
19	N	N	N	N	N	[Signature]	9:30 am (pm)
20	Y	Y	N	Y	Y	[Signature]	8:10 am (pm)
21	N	N	N	N	N	[Signature]	8:15 am (pm)
22	N	N	N	N	N	[Signature]	1:45 am (pm)
23	N	N	N	N	N	[Signature]	4:00 am (pm)
24	N	N	N	N	Y - not enough flow sample	[Signature]	2:00 am (pm)
25	N	N	N	N	N	[Signature]	1:30 am (pm)
26	N	N	N	N	N	[Signature]	7:30 am (pm)
27	N	N	N	N	N	[Signature]	8:00 am (pm)
28	N	N	N	N	N	[Signature]	4:30 am (pm)
29	N	N	N	N	N	[Signature]	4:30 am (pm)
30	Y	Y	N	N	Y	[Signature]	3:00 am (pm)
31	N	N	N	N	N	[Signature]	2:00 am (pm)

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**Daily Flow Log
Southern Brine Pit Area
Pavement Drain Outfalls
Eastern Retention Basin**

Month June, 2003

Date	North Outfall	South Outfall	North Outfall	South Outfall	PRECIP ? (Y/N)	Initials	Time
	FLOW ? (Y/N)		SAMPLED ? (Y/N)				
1	N	N	N	N	N		4:00 am
2	N	N	N	N	N		4:00 am
3	N	N	N	N	N		7:00 am
4	N	N	N	N	Y not enough for Sample		2:00 am
5	N	N	N	N	N		4:20 am
6	N	N	N	N	N		8:20 am
7	N	N	N	N	N		4:30 am
8	N	N	N	N	N		5:15 am
9	N	N	N	N	N		6:00 am
10	Y	Y	Y	N	Y		1:30 am
11	N	N	N	N	N		2:00 am
12	N	N	N	N	N		5:00 am
13	N	N	N	N	N		4:30 am
14	N	N	N	N	N		5:00 am
15	N	N	N	N	N		7:30 am
16	N	N	N	N	N		5:20 am
17	N	N	N	N	N		6:00 am
18	N	N	N	N	N		4:30 am
19	N	N	N	N	N		1:00 am
20	N	N	N	N	N		1:45 am
21	N	N	N	N	N		8:15 am
22	N	N	N	N	N		9:30 am
23	N	N	N	N	N		4:30 am
24	N	N	N	N	N		10:30 am
25	N	N	N	N	N		4:30 am
26	Y	Y	N	N	not enough for a sample		10:00 am
27	N	N	N	N	N		11:00 am
28	Y	Y	N	N	could not sample on Sol		3:00 am
29	N	N	N	N	N		4:00 am
30	N	N	N	N	N		9:10 am
31	N	N	N	N	N		4:30 am

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**Daily Flow Log
Southern Brine Pit Area
Pavement Drain Outfalls
Eastern Retention Basin**

Month July, 2003

Date	North Outfall	South Outfall	North Outfall	South Outfall	PRECIP ? (Y/N)	Initials	Time
	FLOW ? (Y/N)		SAMPLED ? (Y/N)				
1	N	N	N	N	N		5:00 am
2	N	N	N	N	N		11:30 am
3	N	N	N	N	N		4:30 am
4	N	N	N	N	N		4:30 am
5	N	N	N	N	N		4:30 am
6	N	N	N	N	N		11:00 am
7	N	N	N	N	N		6:00 am
8	N	N	N	N	N		4:00 am
9	N	N	N	N	N		4:00 am
10	N	N	N	N	N		10:00 am
11	N	N	N	N	N		1:00 pm
12	N	N	N	N	N		1:00 pm
13	N	N	N	N	N		1:00 pm
14	N	N	N	N	N		1:00 pm
15	N	N	N	N	N		1:00 pm
16	N	N	N	N	N		1:15 pm
17	N	N	N	N	N		1:00 pm
18	N	N	N	N	N		1:20 pm
19	N	N	N	N	N		1:00 pm
20	N	N	N	N	N		1:00 pm
21	N	N	N	N	N		1:00 pm
22	N	N	N	N	N		1:00 pm
23	N	N	N	N	N		1:00 pm
24	N	N	N	N	N		1:20 pm
25	N	N	N	N	N		1:00 pm
26	N	N	N	N	N		1:00 pm
27	N	N	N	N	N		1:00 pm
28	N	N	N	N	N		1:00 pm
29	N	N	N	N	N		1:45 pm
30	N	N	N	N	N		1:30 pm
31	N	N	N	N	N		1:00 pm

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**Daily Flow Log
Southern Brine Pit Area
Pavement Drain Outfalls
Eastern Retention Basin**

Month August, 2003

Date	North Outfall	South Outfall	North Outfall	South Outfall	PRECIP ? (Y/N)	Initials	Time
	FLOW ? (Y/N)		SAMPLED ? (Y/N)				
1	N	N	N	N	N		1230 am pm
2	N	N	N	N	N		1200 am pm
3	N	N	N	N	N		1145 am pm
4	N	N	N	N	N		1200 am pm
5	N	N	N	N	N		1200 am pm
6	N	N	N	N	N		1145 am pm
7	N	N	N	N	N		1145 am pm
8	N	N	N	N	N		1000 am pm
9	N	N	N	N	N		1100 am pm
10	N	N	N	N	N		1100 am pm
11	N	N	N	N	N		1030 am pm
12	N	N	N	N	N		1030 am pm
13	N	N	N	N	N		1130 am pm
14	N	N	N	N	N		1200 am pm
15	N	N	N	N	N		1000 am pm
16	N	N	N	N	N		400 am pm
17	N	N	N	N	N		300 am pm
18	N	N	N	N	N		400 am pm
19	N	N	N	N	N		400 am pm
20	N	N	N	N	N		600 am pm
21	N	N	N	N	Y not enough for flow		1145 am pm
22						am pm	
23						am pm	
24						am pm	
25						am pm	
26						am pm	
27						am pm	
28						am pm	
29						am pm	
30						am pm	
31						am pm	

Daily Flow Log
Southern Brine Pit Area
Pavement Drain Outfalls
Eastern Retention Basin

Month September, 2003

Date	North Outfall	South Outfall	North Outfall	South Outfall	PRECIP ? (Y/N)	Initials	Time
	FLOW ? (Y/N)		SAMPLED ? (Y/N)				
1	N	N	N	N	N		745 @
2	N	N	N	N	N		740 @
3	N	N	N	N	N		8:00 @
4	N	N	N	N	misting Y		8:20 @
5	N	N	N	N	N		750 @
6	N	N	N	N	N		740 "
7	N	N	N	N	N		745 @
8	N	N	N	N	N		750 @
9	N	N	N	N	N		750 @
10	N	N	N	N	N		815 @
11	N	N	N	N	N		8:00 @
12	N	N	N	N	N		8:00 @
13	N	N	N	N	N		1:00 =
14	Y	Y	N	N	Y		4:00 =
15	N	N	N	N	N		745 @
16	N	N	N	N	N		730 @
17	N	N	N	N	N		9:00 "
18	N	N	N	N	N		745 @
19	N	N	N	N	N		1145 @
20	N	N	N	N	N		4:00 =
21	N	N	N	N	N		4:00 =
22	Y	Y	N	N	Y		745 @
23	N	N	N	N	N		555 =
24	N	N	N	N	N		8:00 @
25	N	N	N	N	N		745 @
26	Y	Y	N	N	Y		330 =
27	Y	Y	N	N	Y		345 =
28	Y	Y	N	N	Y		3:00 =
29	N	N	N	N	N		530 =
30	Y	Y	N	N	Y		4:00 =
31	Y	Y	N	N	Y		8:20 @

**Daily Flow Log
Southern Brine Pit Area
Pavement Drain Outfalls
Eastern Retention Basin**

Month October, 2003

Date	North Outfall	South Outfall	North Outfall	South Outfall	PRECIP ? (Y/N)	Initials	Time
	FLOW ? (Y/N)		SAMPLED ? (Y/N)				
1	Y	Y	Z	Z	Y		745 @
2	Y	Y	Z	Z	Y		750 @
3	Y	Y	Z	Z	Y		745 @
4	Z	Z	Z	Z	Z		445 @
5	Z	Z	Z	Z	Z		930 @
6	Z	Z	Z	Z	Z		745 @
7	Z	Z	Z	Z	Z		745 @
8	Z	Z	Z	Z	Z		745 @
9	Z	Z	Z	Z	Z		820 @
10	Z	Z	Z	Z	Z		430 @
11	Z	Z	Z	Z	Z		730 @
12	Z	Z	Z	Z	Z		845 @
13	Z	Z	Z	Z	Z		745 @
14	Y	Y	Z	Z	Y		800 @
15	Z	Z	Z	Z	Z		730 @
16	Z	Z	Z	Z	Z		730 @
17	Z	Z	Z	Z	Z		745 @
18	Z	Z	Z	Z	Z		730 @
19	Z	Z	Z	Z	Z		900 @
20	Z	Z	Z	Z	Z		730 @
21	Z	Z	Z	Z	Z		720 @
22	Z	Z	Z	Z	Z		720 @
23	Z	Z	Z	Z	Z		730 @
24	Z	Z	Z	Z	Z		730 @
25	Z	Z	Z	Z	Z		400 @
26	Z	Z	Z	Z	Z		900 @
27	Z	Z	Z	Z	Z		750 @
28	Z	Z	Z	Z	Z		730 @
29	Z	Z	Z	Z	Z		730 @
30	Z	Z	Z	Z	Z		740 @
31	Z	Z	Z	Z	Z		730 @

Daily Flow Log
Southern Brine Pit Area
Pavement Drain Outfalls
Eastern Retention Basin

Month November, 2003

	North Outfall	South Outfall	North Outfall	South Outfall	PRECIP ? (Y/N)	Initials	Time
Date	FLOW ? (Y/N)		SAMPLED ? (Y/N)				
1	N	N	N	N	N	[Signature]	700 am
2	N	N	N	N	N		130 am
3	N	N	N	N	N		730 am
4	Y	Y	N	N	Y		900 am
5	N	N	N	N	N		730 am
6	N	N	N	N	N		730 am
7	N	N	N	N	N		800 am
8	N	N	N	N	N		400 am
9	N	N	N	N	N		800 am
10	N	N	N	N	N		730 am
11	N	N	N	N	N		730 am
12	N	N	N	N	N		730 am
13	N	N	N	N	N		730 am
14	N	N	N	N	N		730 am
15	N	N	N	N	N		730 am
16	N	N	N	N	N		530 am
17	N	N	N	N	N		700 am
18	Y	Y	N	N	Y		730 am
19	N	N	N	N	N		730 am
20	N	N	N	N	N		730 am
21	N	N	N	N	N		730 am
22	N	N	N	N	Y		800 am
23	Y	Y	N	N	Y		1030 am
24	N	N	N	N	N		730 am
25	N	N	N	N	N		730 am
26	N	N	N	N	N		730 am
27							am pm
28							am pm
29							am pm
30							am pm
31							am pm



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SOSanalytical.com

COMPANY: WILLIAMSBURG R & S

NAME:
PROJECT NO: 02633061-28E

WSSN:
WELL PERMIT:

TAX ID:
LOCATION: 10190 MUNRO RD

MI

COUNTY:
TWP:

INORGANICS/WET CHEMISTRY/METALS

SOS PROJECT NO: 031509 - 1
SAMPLED BY:: TERRY V/WRS
DATE RECEIVED: 5/6/03
TIME RECEIVED: 10:35 AM
SAMPLE ID: NORTH OUTFALL
DATE SAMPLED: 5/5/03
TIME SAMPLED:
SAMPLE MATRIX: WATER

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
BOD 5-DAY EPA 405.1	<67	67	mg/L (PPM)	KMC	5/12/03	
CHLORIDE EPA 325.2	6	3	mg/L (PPM)	KMC	5/6/03	
PHOSPHORUS-TOTAL EPA 365.4M	0.96	0.15	mg/L (PPM)	KMC	5/8/03	
SODIUM - EPA 273.1	5.06	0.5	mg/L (PPM)	KMC	5/6/03	

ND = NOT DETECTED
LOD = LIMIT OF DETECTION
SMCL = FEDERAL NON-ENFORCEABLE LIMIT
MCL = MAXIMUM CONTAMINANT LEVEL
s.u. = STANDARD pH UNITS REPORTED AT 25 C
DISS = DISSOLVED

Page 1 of 1

APPROVED BY: _____
SHANNA SHEA
LAB MANAGER



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COMPANY: WILLIAMSBURG R & S

NAME:

PROJECT NO: 02633061-28E

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG
MI

SOS PROJECT NO: 031810 - 1

SAMPLED BY: JANET/WRS

DATE RECEIVED: 5/20/03

TIME RECEIVED: 3:05 PM

SAMPLE ID: SOUTH OUTFALL

DATE SAMPLED: 5/20/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

COUNTY:

TWP:

INORGANICS/WET CHEMISTRY/METALS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
BOD 5-DAY EPA 405.1	57	40	mg/L (PPM)	KMC	5/27/03	
CHLORIDE EPA 325.2	4	2	mg/L (PPM)	KMC	5/27/03	
PHOSPHORUS-TOTAL EPA 365.4M	0.25	0.15	mg/L (PPM)	KMC	5/22/03	
SODIUM - EPA 273.1	2.59	0.5	mg/L (PPM)	KJ	5/22/03	

RECEIVED MAY 30 2003

Invoice OK

Project Manager

Initials

Exam

EMBED TO SHEET

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

Shanna Shea

SHANNA SHEA

LAB MANAGER



RECEIVED JUN 19 2003

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COMPANY: WILLIAMSBURG R & S

NAME:

PROJECT NO: 02633061-28E

WSSN:

WELL PERMIT:

TAX ID:

LOCATION: 10190 MUNRO RD

WILLIAMSBURG
MI

SOS PROJECT NO: 032255 - 1

SAMPLED BY: JANET/WRS

DATE RECEIVED: 6/10/03

TIME RECEIVED: 2:15 PM

SAMPLE ID: NORTH OUTFALL

DATE SAMPLED: 6/10/03

TIME SAMPLED:

SAMPLE MATRIX: WATER

COUNTY:

TWP:

INORGANICS/WET CHEMISTRY/METALS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
BOD 5-DAY EPA 405.1	12	4	mg/L (PPM)	KMC	6/16/03	
CHLORIDE EPA 325.2	3	2	mg/L (PPM)	KMC	6/17/03	
PHOSPHORUS-TOTAL EPA 365.4M	0.21	0.05	mg/L (PPM)	KMC	6/12/03	
SODIUM - EPA 273.1	5.0	0.5	mg/L (PPM)	KJ	6/12/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

SHANNA SHEA
LAB MANAGER

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COMPANY: WILLIAMSBURG R & S

SOS PROJECT NO: 033010 - 1

NAME:

SAMPLED BY: JANET/WRS

PROJECT NO: 02633061-28E

DATE RECEIVED: 7/10/03

WSSN:

TIME RECEIVED: 4:55 PM

WELL PERMIT:

SAMPLE ID: SOUTH OUTFALL

TAX ID:

LOCATION: 10190 MUNRO RD

DATE SAMPLED: 7/10/03

WILLIAMSBURG
 MI

TIME SAMPLED:

SAMPLE MATRIX: WASTE WATER

COUNTY:

TWP:

INORGANICS/WET CHEMISTRY/METALS

<u>Analysis</u>	<u>Concentration</u>	<u>LOD</u>	<u>Units</u>	<u>Analyst</u>	<u>Date Completed</u>	<u>Drinking Water Reg Limit(MCL)</u>
BOD 5-DAY EPA 405.1	27	14	mg/L (PPM)	KMC	7/16/03	
CHLORIDE EPA 325.2	5	2	mg/L (PPM)	KMC	7/15/03	
PHOSPHORUS-TOTAL EPA 365.4M	0.08	0.05	mg/L (PPM)	KMC	7/17/03	
SODIUM - EPA 273.1	13.4	5.0	mg/L (PPM)	KJ	7/11/03	

ND = NOT DETECTED

LOD = LIMIT OF DETECTION

SMCL = FEDERAL NON-ENFORCEABLE LIMIT

MCL = MAXIMUM CONTAMINANT LEVEL

s.u. = STANDARD pH UNITS REPORTED AT 25 C

DISS = DISSOLVED

APPROVED BY:

Shanna Shea

SHANNA SHEA
 LAB MANAGER